THE RAILWAY GAZETTE
A Journal of Management, Engineering and Operation
INCORPORATING
The Railway Engineer · TRANSPORT · The Railway News
The Railway Times · Herapath's Railway Journal · THE RAILWAY RECORD.
RAILWAYS ILLUSTRATED · ESTABLISHED 1835 · THE RAILWAY OFFICIAL GAZETTE

PUBLISHED EVERY FRIDAY
AT
33, TOTHILL STREET, WESTMINSTER, LONDON, S.W.1
Telegraphic Address: "TRAZETTE, PARL, LONDON"
Telephone No.: WHITEHALL 9233 (6 lines)

Annual subscription payable in advance and postage free
British Isles and Abroad.....£2 5s. 0d.
Single Copies.....One Shilling
Registered at the General Post Office, London, as a Newspaper

VOL. 68. No. 21 FRIDAY, MAY 27, 1938

CONTENTS

	PAGE
Editorials	1005
Letters to the Editor	1010
The Scrap Heap	1012
Overseas Railway Affairs	1013
Operating the L.M.S.R.	1015
Standardising Power Signalling in Italy	1019
New Southern Suburban Line	1020
Junction Indicators in Colour-Light Signalling	1027
Improved 4-6-4 Locomotives, New York Central	1029
Railway News Section	1031

ELECTRIC RAILWAY TRACTION

A Supplement illustrating and describing developments in Electric Railway Traction is presented with each copy of this week's issue

New Southern Suburban Line

MR. E. J. MISSENDEN, Traffic Manager of the Southern Railway, described the opening of a new surface railway in England today as an unusual event, when addressing representatives of local authorities and the press who had been invited last Wednesday to inspect the company's new branch line, described on pages 1020 to 1026. He referred also to the coincidence that just 100 years ago the first section of the old London & Southampton Railway between Nine Elms and Woking had been opened with a station then named Kingston, but subsequently changed to Surbiton, which was in the same borough as the temporary terminus at Tolworth of the new line to be opened on Sunday, May 29. How enormously traffic had developed, and how rapidly it was still growing, was shown by the recent census of passengers conveyed to and from the various London terminal stations of the Southern Railway. On a normal day 733,500 passengers used these stations, an increase of almost 42 per cent. over the number carried ten years ago. Of this number 47,050 arrived at Waterloo between 7 and 10 a.m., as many as 24,300 of these during the busiest hour. In 24 hours 1,424 trains arrived at and left Waterloo, carrying a total of 151,570 passengers. Mr. Missenden referred to the recent visit of Southern Railway officers to the U.S.A., in which country in 1936 the railways conveyed 490,000,000 passengers over a route-mileage of nearly 242,000, whereas the Southern Railway alone in 1937 conveyed 378,000,000 passengers over its system of 2,200 route-miles.

* * * *

Railway Wage Claims

The three railway trade unions last week submitted to the four main-line railway companies claims for wage increases and improved conditions of service. The claims, which are outlined on page 1037, and which will be dealt with through the agreed machinery of negotiation, differ widely, and there is no one claim which all three unions jointly put forward. Certain of these claims are, in essence, similar to claims put forward last year and dealt with in Decision No. 3 of the Railway Staff National Tribunal. That body—to which the present claims may eventually go for determination—has expressed clear views as to the standards by which claims should be judged. The tribunal has expressed the hope that the unions and the companies would, in future, be able to present claims of such a character as to have some reasonable prospect of reaching a satisfactory settlement. The two features in this respect stressed by the tribunal were simultaneous presentment, and the fact that the extent of practical concessions must be limited by the financial position and prospects of the companies. Although some satisfaction may be felt that, on this occasion, simultaneous presentment has been achieved, there must be regret that a common claim has not been found possible, while the dimensions of the demands cause us to doubt whether they could be granted in full.

* * * *

The Week's Traffics

Traffics for the past week, being for a "normal" period, show considerable fluctuations in comparison with those for the corresponding week in 1937, which, besides being influenced by the Coronation, included the figures for the Sunday and Monday in Whitsun week on the L.N.E.R. and for the Monday on the three other main-line railways. Total passenger traffics are as a result £342,000 down, while total goods and merchandise show moderate increases amounting to £60,000 and £51,000 respectively.

	20th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	
	£	£	£	£	£	%
L.M.S.R. ..	− 126,000	+ 33,000	+ 17,000	− 76,000	− 383,000	− 1·61
L.N.E.R. ..	− 82,000	+ 6,000	+ 5,000	− 71,000	− 186,000	− 1·05
G.W.R. ..	− 47,000	+ 16,000	+ 27,000	− 4,000	− 59,000	− 0·60
S.R. ..	− 87,000	+ 5,000	+ 2,000	− 80,000	− 96,000	− 1·27

London Transport receipts for the past week amounted to £573,700, an increase of £120,100, and the aggregate for the 47 weeks to date is £26,454,600, an improvement of £489,100.

* * * *

Finnish State Railways Results

A year of increased traffics and receipts with expenditure mounting at a slower rate was experienced by the Finnish State Railways in 1937. The total receipts were 1,066 million Finnish marks, this being an increase of 15 per cent. over the 1936 figure, and as the working expenditure increased only by 9·3 per cent. to F.M. 736·1 million, the operating ratio fell to 69 from 73. Including the year's amortisation and capital charges, the total expenses aggregated F.M. 817·8 million. Freight traffic accounted for 70 per cent. of the revenue, passenger traffic for 25·5 per cent., and miscellaneous receipts for 4·5 per cent. The number of passengers carried was 21·2 million, representing an increase of 9·5 per cent. compared with 1936, and the goods tonnage rose by 15·2 per cent. to 15·2

million *tonnes*. New lines totalling 116 km. were opened during the year, making a gross length open to traffic at the beginning of 1938 of 5,483 km., over which were spread 2,078 stations and halts open to general traffic. The staff of the railway system at the end of the year was 26,461, an increase of 1,144 over the previous year's total.

* * * *

Accidents to Platelayers

The accident at Hademore on May 20, in which three platelayers lost their lives, revives the question of an efficient warning to men working on the track. We had occasion to refer to this in an editorial article in THE RAILWAY GAZETTE of August 27, 1937, page 349. The accident which then gave rise to our comments was due to the view of the look-out man being obscured by steam and smoke. At Hademore the principal factor seems to have been that of noise, with range of visibility restricted by a bridge on a curve. The regulations are quite clear (Rule 234 (*a*)) but to follow them to the letter proves, in certain circumstances, to be a counsel of perfection. Some better form of warning might conceivably be devised, independent of the human look-out, whose vision and hearing may be obscured at the critical moment, and whose action is always subject to a time lag. It is possible to imagine a signal, audible or visual, actuated from the nearest signal box by, say, short-wave wireless. Or even better, an "invisible ray" installation, in which the warning would be worked by the approaching train itself. No doubt these and many other ideas have been considered by the railway companies, and we should like to repeat our suggestion that the matter is of sufficient importance to be made a subject for discussion at the next International Railway Congress.

* * * *

"Mind the Doors"

To the traveller on our London tube railways, the warning of porters and conductors at every station to "mind the doors" is generally not so effective as it ought to be, owing to the manner in which the words are spoken. There seem to be as many accents as there are announcers, but too often the three simple words are unintelligible. The "seasoned" traveller, the habitué, does subconsciously mind the doors, but the foreigner and the provincial within our gates quite fail to understand the warning, as we have noticed when sport or other occasion has filled London with visitors. The nervous state of indecision of the stranger in unfamiliar surroundings is aggravated by the hoarse unintelligible cry, bawled maybe in his very ear, and while he hesitates, confounded, the portals close. Some day, perhaps, the L.P.T.B. will arrange for a robot golden voice to be heard above every carriage door, conveying to the waiting passengers in clearest English and in dulcet tones, the friendly admonition to "mind the doors."

* * * *

The Edinburgh Transport Congress

In the discussion of the three papers presented at the Institute of Transport Congress in Edinburgh last week, the main theme was the difficult position into which the various forms of transport in this country were being forced by their rivalry to supply the requirements of the population in more ample measure than the population could use them; and, arising out of this dilemma, the increasing control tending to restrict the development of transport facilities to the inadequate effective demand. One speaker appealed for an impartial enquiry to raise the problem out of the field of controversy; and another, while supporting the suggestion, urged the importance of getting down to a basis of reality. If transport facilities are so ample and the desires of the population to make use of them are thwarted only by inability to pay for them, there must be a flaw in the system of accounting their cost. A realistic costing system would either show cost equivalent to the money people had in their pockets to meet it, or alternatively would contain some means by which purchasing power could be distributed in sufficient quantity to individuals to enable them to enjoy as consumers all that they, as producers, could provide.

* * * *

New York-Chicago in 16 Hours

The long-expected acceleration of the Twentieth Century Limited and the Broadway Limited to a journey of 16 hr. between New York and Chicago will take effect on June 15, with the introduction of new streamlined stock. The latest methods of weight reduction, including the use of high-tensile alloy steel, have been used in the construction of the cars, which have been brought down to about two-thirds of the weight of the stock now in use. Single room sleeping cars of various types and distinctive dining accommodation will make up a very original internal scheme. With a route of 958 miles to cover, the New York Central will require to average almost exactly a mile-a-minute throughout, including stops. What the Pennsylvania lacks in distance, with its 908-mile route, however, it makes up in gradients, as on its lengthy mountain section through the heart of the Alleghenies, the trains have to be lifted by extremely steep gradients to a maximum altitude of 2,194 ft. at Gallitzin.

* * * *

Further North by Air

The summer timetable of Railway Air Services Limited, operative from May 23, is for the first time able to show a journey in 8¼ hr. flying time from London to Lerwick, in the Shetlands, accomplished throughout by machines of the company or of its associates. Indeed, until the beginning of May the airlines serving the Shetlands, the Orkneys, and the North of Scotland penetrated no further south than Inverness or Aberdeen, while no route from London ran further north than Glasgow or Dundee. The gap was closed on May 1 when Scottish Airways Limited (in which Railway Air Services is an associate through the L.M.S.R.) took over the previously independent lines in the Far North and extended them southwards from Inverness, through Perth, to Glasgow. The British airway map gained much by this move, for continuous air communication to London was afforded both *via* Perth and the North Eastern Airways East Coast route, and *via* Glasgow and Railway Air Services. The London—Lerwick timing mentioned above is *via* Belfast and Glasgow, but if the northbound departure from Glasgow were altered to connect with the direct service from London, it could be reduced to 7 hr. 5 min.

* * * *

Trans-Canada Air Lines

The first annual report of the directors of Trans-Canada Air Lines, covering the year 1937, has now been published. Formed under the powers of the Trans-Canada Air Lines Act of April 10, 1937, the company is in effect a subsidiary of the Canadian National Railway Company, which has subscribed the authorised capital of $5,000,000 in $100 shares and furnishes services in the accounting, advertising and publicity, legal, medical, purchasing, secretarial and treasury departments. In accordance with the terms of the Act there are seven directors, three appointed by Order in Council and four elected by the shareholders. The contract between the Government and the new corporation is for a period of ten years effective

from June 1, 1937, and it provides that for the initial period, *i.e.*, until December 31, 1939, any deficits in operation shall be covered by Government subsidy. The first commercial operation was the Vancouver-Seattle service for passengers and mails, taken over on September 1, 1937, with equipment and staff, from Canadian Airways Limited. Passenger services between Winnipeg (the operating headquarters) and the coast will not be operated until all airport and airway facilities have been tested under operating conditions. Operating revenues in 1937 amounted to $16,279 and operating expenses to $25,431, but the total deficit to be reimbursed by Dominion subsidy is $111,005. At present the staff numbers 71. The head office of the company is at Montreal.

* * * *

More Route-Setting in the U.S.A.

For a good many years American signal engineering achieved remarkable progress in the development of automatic and power signal equipment, the distances between large centres and the long stretches of single line having greatly influenced the course of American signalling development. In the power signal boxes, however, the individual lever system kept the field and no serious attention appears to have been paid to the route setting principle for a long time after it was well known in France, which, considering the care and ingenuity bestowed on power signalling in America, has surprised us. Of late, however, a change has become noticeable, and there are now some interesting examples of route-setting apparatus, using the principle, long standard on the former French Eastern Railways, in which the signalman has only to operate handles corresponding to the beginning and end of a move to set and signal it.

* * * *

Train or Tram?

In Continental countries where steam tramways provide inter-village transport in rural areas, and also handle goods traffic, the distinction between such systems and similar small lines which can properly be dignified with the title of " railways " is hard to draw. Holland publishes a special timetable—the *Tramgids*—for services of this kind, wherein are included certain lines which may be considered as small railways because they belong to the Nederlandsche Spoorwegen, and others operated by steam tramway companies specifically so-called. The locomotive and van illustrated on page 1028 (from a photograph submitted by Dr. H. A. Whitcombe) are running on the Ede—Wageningen line (closed to passenger traffic on March 13 last year) of the Netherlands Railways; but engines of similarly orthodox railway type are in the great majority on the Hulst—Walsoorden Steam Tramway, and the Limburg Tramway. They also slightly outnumber tramway type locomotives on the Eerste Drentsche Steam Tramway, and the Oostelijk—Groningen Steam Tramway. On other steam tramways in Holland true tramway locomotives are used almost exclusively. Many of these lines have now ceased passenger traffic in favour of motor-bus services, and devote themselves to the goods transport which was always their principal business.

* * * *

To Paris *via* Dieppe

Although Newhaven is now the recognised Sussex port for Dieppe sailings, both Brighton and Shoreham were used extensively a century ago, and the reconstruction work which is now being carried out at Kingston Wharf, Shoreham-by-Sea, recalls the position this long-established wharf once held among the cross-Channel ports. In 1825 the General Steam Navigation Company inaugurated a twice-weekly Newhaven—Brighton—Dieppe service, but ten years later it had become Shoreham—Brighton—Dieppe. The railway from London to Brighton was completed in September, 1841, and *The Railway Times* of 1843 contained advertisements of services from " London to Paris by steamer and railway, *via* Brighton Railway Terminus, Kingston Wharf, and Dieppe or Havre." The boats were then run by the General Steam Navigation Company in conjunction with the Brighton Railway, and the sailings to Dieppe from Kingston Wharf were on Mondays, Wednesdays, Thursdays, and Saturdays at varying times, with a call at Brighton (Chain Pier) about half an hour afterwards. The services to Havre were on Tuesdays and Fridays. The advertisement mentions that an additional boat, the *Venezuela*, had just been placed " upon the Dieppe and Shoreham Station." The importance of Shoreham declined, however, after the opening of the railway to Newhaven in December, 1847.

* * * *

Locomotive Improvements

It is sometimes remarked with more or less emphasis that, its size and weight apart, the steam locomotive has progressed less than might be expected in its 120 odd years of existence. It is true that in principle it remains the same. We still have reciprocating pistons driving through rods direct on the crankpins or crank axle of a pair or pairs of coupled wheels; the boiler retains its customary form, and in certain other respects also the " normal " locomotive conforms to its earlier and smaller prototype. On closer investigation, however, the modern fully-equipped locomotive differs greatly from its predecessors. The boiler, apart from carrying a higher steam pressure, is equipped with superheating apparatus, and in many cases the firebox is provided with a combustion chamber; regulator valves have been improved, and injectors and feed-water devices fitted. The boiler water itself is often treated; tube cleaners or " soot blowers," as they are sometimes called, are used, and improved forms of blast pipes have been introduced. Such devices as thermic syphons and mechanical stokers add still further to boiler efficiency, whilst in the " machinery " section, improvements extend to valve gears, the use of roller bearings, lubrication, and last but not least, greater comfort and convenience for the enginemen. Considerable advances have also been made in locomotive metallurgy.

* * * *

The Railman

It was to be expected that modern journalism would reject that formidable trisyllable, " railwayman." Pruned to the less distinguished form of " railman," we are getting used to it in such headings as " Railman Retires," " Railman's Reminiscences," or, more rarely, " Honour for Railman." Like its predecessor, this word is sufficiently nondescript for " Railmen Confer," for example, to be equally applicable to the deliberations of the General Manager's Conference, or to a meeting of an engine drivers' darts league. This is a convenience, for if the lay press tried to be more explicit we place the odds at a shilling to a halfpenny—or a Divisional General Manager to an Assistant Inspector of Drains (outdoor)—that it would perpetrate some blunder in rank or title calculated to shake the railway world to its foundations. We suppose, therefore, that the abridgment must be tolerated, and we have no doubt that our readers will join us in our prayers that no officer may live to see himself described in one of the " tabloid " papers as a " railboss." But if " railwayman " is really too ponderous for modern taste, we would suggest trying the tripping, liquid syllables of " railfellow "—railfellow, well met!

XUM

Exceptional Rates

UNDER the provisions of the Railways Act, 1921, as modified by the Road and Rail Traffic Act, 1933, the British railway companies were authorised to grant exceptional rates below the standard scales of charges fixed by the tribunal for operation as from January, 1928, provided that those between 5 and 40 per cent. below the appropriate standard charge are reported to the Minister of Transport, and those more than 40 per cent. below the standard are submitted to and approved by the tribunal. Statements furnished to that body during its recent annual review of railway charges show that during 1937 the number of exceptional rates granted in respect of merchandise traffic was 174,623 as compared with 174,668 during 1936. The figures for 1937 exclude, however, 6,074 group rates not more than 40 per cent. below the standard which were granted for potatoes (not new) between certain Scottish groups of stations and English and Welsh groups respectively which could not readily be classified under the headings usually adopted. The inclusion of these in the total makes the number of exceptional rates granted for merchandise traffic during 1937 appreciably higher than the 1936 figure, and the highest number granted in any year since the introduction of standard charges in 1928. An analysis of those granted in 1937 shows that 96,262 or considerably over one-half, were more than 25 per cent. below the standard, an increase of 41,035 compared with the previous year; further, 16,639 or 9·53 per cent. of the total were more than 40 per cent. below the standard as compared with 11,016 and 6·31 per cent. in 1936.

It is of interest to find that the largest number of exceptional rates was granted in respect of vegetables (42,780 or 24·5 per cent.), while the next largest number was for grain, flour and milling offals (35,828 or 20·5 per cent.) and oil cake (13,813 or 7·9 per cent.). The statistics show that the greatest proportionate increase in the exceptional rates for particular commodities occurred in connection with manure in List Q, for which 11,130 reduced rates were quoted as compared with 2,014 in 1936. It is noticeable that the exceptional rates quoted for coal class traffic declined from 23,617 or 13·5 per cent. in 1936, to 17,140 or 9·8 per cent. in 1937, although the tendency for collieries situated near the sea coast to divert former rail-borne traffic destined for London and the South coast, to coastwise steamer, leaving the companies to perform only the short haul at each end, still continued. As to the individual companies, the Great Western granted 7,800 fewer reduced rates than in the previous year, but all the other companies increased their figures. Actually over 1,280,000 reduced rates have been granted for merchandise train traffic during the last ten years, a striking indication of the pressure which is being exerted on the railway rates structure and classification of merchandise. These figures are not a complete measure of the position, however, as it does not necessarily follow that traffic was secured by all the rates quoted, nor do mere numbers give any indication of the tonnage of the traffic secured or the amount of revenue derived thereform.

So far as merchandise by passenger train is concerned, 15,748 exceptional rates were quoted in 1937 compared with 20,232 in the previous year. It is noteworthy, however, that 3,555 rates or 22·57 per cent. were more than 40 per cent. below the standard, as compared with 3,792 or 18·74 per cent. during 1936. Apart from exceptional rates, the quantity of traffic conveyed at agreed charges showed a further increase during 1937, and at the end of that year there were 522 such charges in operation as compared with 367 at the end of 1936, while a further 157 had been accepted by traders and were awaiting approval by the Railway Rates Tribunal. The total revenue derived from traffic charged under this head in 1937 was about 3½ per cent. of the companies' total revenue from parcels and goods train traffic.

* * * *

Chief Operating Manager, L.M.S.R.

"CHIEF Operating Manager" is a high sounding title—and rightly so, because the post it describes is a big one, whether here or abroad. To have been the chief operating officer of the L.M.S.R. for so long as eleven years is an achievement, and to let Mr. C. R. Byrom who retires at the end of May depart without a special word from us would be a strange omission. Statistically expressed, the L.M.S.R. Operating Department is interested in:—

2,391	Passenger stations
2,912	Goods stations
4,136	Signal boxes
225	Locomotive sheds
7,688	Locomotives
23,422	Coaching vehicles
281,753	Freight vehicles

It operates on 6,870 route-miles of line, over which about 13,500 passenger and 16,000 freight trains are run daily. The staff in the Operating Department amounts approximately to 122,000. These figures illustrate the extent of the work of the department controlled by Mr. Byrom. But the greater the extent the greater the complexity; the planning of the various movements of men, engines, and stock in order to work trains, and the control of fluctuating traffic—passenger and freight—together with the critical review of results, raise problems of magnitude and require organisational powers of no mean order. During Mr. Byrom's time as Chief Operating Manager of the L.M.S.R. he saw the worst slump in the history of railways in this country, during which drastic methods of reorganisation had to be applied in order to reduce expenditure. This was followed by a rapid increase in traffic and by improved and extensive commercial efforts which raised new operating problems. Faster freight trains with additional connecting services; altered and increased flows of mineral traffic; accelerations of passenger trains (not only the introduction of a few especially fast trains but a general acceleration of express and local trains); the running of evening and other excursion trains; these and other factors added to the responsibilities and anxieties of the railway operating officer.

It may rightly be said that the problems of the last few years from an operating point of view have been something quite new; and, moreover, as a result of the amalgamation they have had to be tackled for a much bigger railway than previously existed. To have dealt efficiently with the everyday matters connected with so large a department, and at the same time to have coped with the particular and fundamental changes which have taken place recently, is something to be proud of; and this thought will we hope be a comfort to Mr. Byrom in his retirement. Chief Operating Manager of the L.M.S.R.—he commands an army of men and the equipment they use—how little the ordinary person really knows of such a man's work! Mr. Byrom's name was on the timetables. This was his only advertisement. He never courted publicity or popularity. To give up such a command means a sudden change from great and responsible activity to comparative idleness, and we hope that he will have happiness and health, in this freer time when he has handed over the baton to Mr. Royle, to whom we take this opportunity of sincerely wishing success and joy in his new post.

XUM

The "Guppy" Incident of May 31, 1838

THE opening to the public of the first section of the Great Western Railway took place on June 4, 1838, but five days earlier a distinguished company of directors, members of Parliament, and other celebrities numbering about 300 travelled over the section from Paddington to Maidenhead Bridge (now Taplow). Having inspected the temporary terminus and Brunel's bridge then in course of construction over the Thames, they returned as far as Salt Hill, Slough, and it was here that an incident occurred which was to make the occasion particularly memorable. A large marquee had been pitched alongside the railway at Salt Hill, in which " a substantial repast " was served prior to the completion of the return journey to London, and it is only reasonable to assume that this part of the day's proceedings was in every way worthy of the great occasion. Luncheon was followed by a number of toasts which included, *inter alia*, the health of the Chairman, the Engineer, and the President of the United States, not to mention the prosperity of other railways whose representatives had been invited.

Among other Bristol directors present was Mr. Thomas Richard Guppy who has claims to distinction in being one of four influential business men (Messrs. Jones, Harford, Guppy, and Tothill) who had met at Temple Backs, Bristol, as early as 1832 and there initiated the scheme for the construction of the railway. Mr. Guppy was also one of the twelve Bristol directors elected at an historic meeting in London in August, 1833, when the title " Great Western Railway " was adopted for the undertaking. Further, like some other Bristol G.W.R. directors, he was also a director of the Great Western Steamship Company and had doubtless recently attended the triumphant arrival at Bristol of the ss. *Great Western* from New York on her inaugural round trip. Beyond these facts, little appears to be known (excepting the incident now to be recalled) regarding the man who, contemporary with the great novelist of the age, was distinguished by such a delightful Dickensian name. It was doubtless subsequent to the " substantial repast " that the proceedings of May 31, 1838, were enlivened by an act which indelibly inscribed the name of " Guppy " in the annals of the Great Western Railway, for he proceeded to climb to the roof of one of the carriages composing the train, which was in motion at the time, and then to walk its full length along this elevated track to the astonishment of the assembled company. We must remember that it was Coronation Year and the gala spirit was abroad. It was also a fine May morning and there is good reason for concluding that Mr. Guppy was intent upon " making a day of it " to celebrate an auspicious occasion.

Let us try to visualise the scene as one of the party—and a director to boot—is seen on the roofs of the carriages waving his tall hat triumphantly as he leaps chamois-like (we may assume) from carriage to carriage. From his lofty position Mr. Guppy would be able to see Windsor Castle, the home of the young Queen who, some four weeks later, was to be crowned at Westminster. From his vantage point he could also overlook the Bath Road, which parallels the railway for some distance at this point and along which an average of 70 coaches then passed daily. Possibly he even foresaw the effect of the steam railway upon road traffic. Admittedly the facts about the " Guppy " incident are all too few. We should much like to know what really inspired this sudden and complete disregard of the by-laws of the company (which was to be a pioneer of " safety " methods) by one of its directors. Was it a challenge from a fellow host or guest; was Mr. Guppy anxious to display his gallantry before the eyes of some fair Arabella or Clarissa; or was it sheer bravado? At this distance of time, the motive can only be mere conjecture. It is indeed possible that, had someone blessed with a less intriguing cognomen been responsible for the escapade, it would not have survived for a round century, but the name of the hero combined with the occasion of his achievement have not only ensured the story being handed down but also associated the name of " Guppy " for all time with the opening of the G.W.R.

* * * *

Norwegian State Railways

THE report of the Norwegian State Railways for the year ended June 30, 1937, shows receipts totalling Kr. 78,310,000, against Kr. 73,220,000 in the previous year; and expenditure to the amount of Kr. 82,340,000, against Kr. 75,720,000, giving a loss of Kr. 4,030,000, against Kr. 2,400,000; motor vehicle services are included, and all miscellaneous activities. Actual railway operating receipts rose by 6·9 per cent. and costs by 8·5 per cent. The increase in expenditure is attributed to rising wages and salaries and increased costs of materials. The increase in traffic has necessitated the employment of additional staff, and higher speeds have occasioned increased expenditure on the track and associated works. Leaving the Ofoten line to Narvik out of consideration, the ore traffic over which is of a special character, the average receipts per passenger and *tonne*-kilometre have fallen, being Kr. 4·8 and 6·5 respectively. The greatest percentage increase in traffic receipts was for luggage, 11·2 per cent., with passenger receipts next at 9·4. Train-kilometres rose from 17,560,000 to 18,670,000; passengers carried from 19,290,000 to 20,600,000; and goods traffic, inclusive of ore, from 8,870,000 to 11,150,000 *tonnes*. Passenger traffic to and from foreign countries again increased, 241,978 passengers being conveyed through the four frontier stations at Kornsjö, Charlottenberg, Storlien, and Vassijaure (on the Ofoten line), against 213,518 in the previous year. The ore traffic via Narvik increased over 40 per cent. Certain goods rates were raised with a view to improving receipts, the reduced rates on timber being abolished. Charges for complete wagon loads have now been increased by 10 per cent., as from July 1, 1937, the close of the year under review, while cattle rates have been put on the 1934 level.

The route length operated remained the same, but 22 km. (13·67 miles) of narrow gauge line were converted to standard gauge, leaving the narrow gauge route length at 702 km. (436 miles) and the standard at 3,662 km. (2,275 miles), so that barely a fifth of the system is now narrow gauge. About 657 km. (408 miles) of line were under construction when the financial year closed. Staff employed numbered 13,253 against 12,708 in the previous year. The operating results of the privately owned lines, the length of which was 321 km. (199 miles) were much less satisfactory than those of the State Railways, and the only section of importance was the 109-km. (67¾-mile) Valdres line, which has now passed to the State, and accounted for Kr. 308,364 out of the Kr. 544,564 of receipts of the private railways. Total goods receipts were Kr. 2,860,000 and of these Kr. 373,795 were due to this line. Two other lines showed a modest surplus, but the remainder were worked at a loss. The normal gauge rolling stock was increased by 19 passenger and restaurant vehicles, 163 goods wagons, and one railcar, while 127 vehicles, mostly goods wagons, were scrapped. At the close of the year the rolling stock of the Valdres line was acquired, consisting of seven steam locomotives, eight passenger carriages, three vans, one railcar, and forty wagons. No new narrow gauge stock was obtained but one steam locomotive and 77 vehicles were scrapped.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

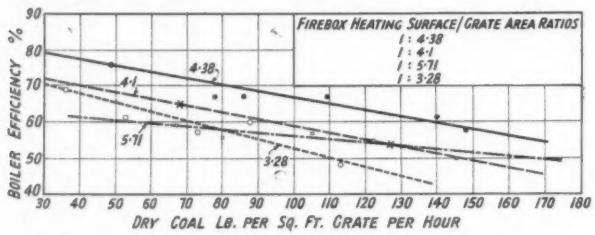
Alsace-Lorraine Pacifics

Wildau, Berlin,
April 24

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—There are one or two points arising from a study of the article on the above engines printed in your issue of April 15 which have arrested my attention and to which I would like to refer. It is proper to commence with the boiler performance. The efficiency is stated to have been 66 per cent. for firing rates of 78 to 82 lb. of coal per sq. ft. of grate per hr. This figure, which is characterised as being low, is attributed to the relatively small firebox.

Taking into consideration the heating surface particulars given it would seem that the firebox surface in relation to heat furnished by the tubes and flues is more or less normal, while the firebox-heating-surface/grate-area ratio of 4·15 appears a fair mean figure, especially in the case of grate areas upwards of 30 or 40 sq. ft. However, in any event it seems hardly safe to ascribe a low overall boiler efficiency to one feature only, even if it be admitted that the efficiency at the rate of working is in fact low. As having a bearing on this aspect of the question I submit a series of results in the form of a graph comparing four boilers with differing firebox-heating-surface/grate-area ratios.



Graph showing a series of results of boiler efficiency plotted against firing rate, comparing four boilers with differing firebox-heating-surface/grate-area ratios

However consistent with what I have said above, these results are not put forward as being conclusive, but at any rate the boilers having the longer grates in proportion to the firebox heating surfaces are certainly not inefficient compared with the boiler having the smallest grate in proportion to the heating surface of the firebox. Taking the figures given for the boiler performance it would appear that the loss through unburned fuel cannot be very great because the efficiency of 66 per cent. and the smokebox loss of 22·5 per cent. when added together equal 88·5 per cent., leaving only 11·5 to cover all other losses including, of course, that through unburned coal. I suggest therefore that we must look beyond the firebox for the cause of this low efficiency if it is actually appreciably lower than is to be expected. The lines in the graph possibly indicate average results and it will be noted that at a firing rate of 80 lb. of coal per sq. ft. of grate per hr., the boiler efficiencies range between the limits of 58 to 70 per cent.

Turning attention now to the engines, that is the cylinders, the working efficiency is said to be high. Certainly the water rates given are low, but does that mean that the efficiency is high? At a constant rate of evaporation the steam regulator opening and boiler pressure may be expected to remain the same, so also will the superheat and the pressure in the exhaust, as both are dependent upon the steam flow. Theoretically the cut-off will be inversely proportional to the speed in revs. per min. Actually at high rotational speeds the cut-off for a given steam consumption would be a little later compared with that required at lower speeds, no matter what type of valve gears is employed.

The steam conditions given are, at the steam chest, 278 lb. per sq. in.; temperature 700-720° F., say 710° F. Each pound of steam therefore carries 1,375 B.Th.U., and if we assume that, the engines being non-condensing, the lower limit is the pressure of the atmosphere, the available adiabatic heat drop is 272 B.Th.U. Now the cylinders are said to require 14·76 and 13·46 lb. of steam per i.h.p. hr., meaning that for each pound of steam passing through the cylinders 172 and 189 B.Th.U. are turned into work. These figures are for the highest and lowest consumptions respectively and correspond to working efficiencies of 63 and 69 per cent. A little disappointing I suggest.

If we could really know all there is to know about the steam action in these cylinders we might learn something that possibly we ought already at least to suspect. I will not say more but simply ask how much is that very low exhaust temperature accountable for the thermal performance of these cylinders? It is not easy to know what the thermal efficiency is in locomotive cylinders, but I think it likely that with steam at about 200 lb. per sq. in. and at a temperature of say 600° or 650° F. steam rates at 15 to 20 per cent. cut-off are pretty close to 15 lb. per i.h.p. hr., corresponding to about 74 per cent. efficiency calculated as above; and if this be admitted it would seem that we must not look for very much further gain when expanding steam at the higher pressures in simple cylinders. High pressure steam in simple cylinders has its advantages but high working efficiency is not I think one of its virtues.

Yours faithfully,
E. CECIL POULTNEY

Overturning Tests in South Africa

Tile House, 8, Comiston Rise,
Edinburgh,
May 20

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I was pleased to see Mr. Broomfield's critical letter in THE RAILWAY GAZETTE for May 13, but I think he goes a little out of his way to sugar the pill. I have come to find some amusement in observing how, as each wave of fresh intelligence breaks upon the railway beach, some one or more, armed to the teeth with force polygons and so forth, set about demonstrating with formula and graph, to the old hands, who, of course, cannot be expected to have heard of such things, the dependence of the "factor of safety" on the overturning speed of trains. But here, in these notes on "Overturning Tests in South Africa" in your issue of March 25, we have not only our hoary old friend the centrifugal force parallelogram, but an armament of costly cinécameras, kymographs, and what not. And the conclusion of the whole matter; it is so naive, so far as vouchsafed to us, that I must give it as it stands. It was shown "How well a vehicle holds the rails at speed despite . . ." etc., and nothing more. *Parturiunt montes* indeed! I picture the author, before the world-shaking experiments were undertaken, watching with bated breath a train speeding round a curve and expecting it to roll over any minute like a shot rabbit. Having failed to produce a case of overturning, it being reasonable to assume that otherwise it would have been mentioned, how relieved he must feel in the assurance that, in a sort of logical sense, the "factor of safety" is infinite. By and by experience will show that curve derailments do occur, and never, or almost never, by overturning. Then, if these sackbuts, psalteries, and all kinds of apparatus do succeed in demonstrating the relationship between the radius and derailing speed, I shall have to eat my words, but I am visited by no urgent apprehensions.

Yours faithfully,
REGINALD PETERS

XUM

PUBLICATIONS RECEIVED

Government Regulation of Transportation. By Emory R. Johnson. London: D. Appleton-Century Co. Inc., 34, Bedford Street, Strand, W.C.2; and New York. 8¾ in. × 5¾ in. × 1½ in. 680 pp. + xiv pp. Price 21s. net.—In this comprehensive and important volume Dr. Emory R. Johnson, whose reputation as a transport authority is well known, works out suggestions for a national transportation policy in the United States under Federal Government regulation, which should include all forms of transport, namely, by railways, waterways, highways, pipe lines, and airways. The greater part of the work is naturally devoted to railways, which have been subjected to some form of regulation, by States or the Federal Government, or both, ever since 1870. Waterways, on the other hand, have so far been petted and largely uncontrolled. Intrastate motor traffic on highways has been regulated to some extent by individual States, and Congress passed an Act in 1935 to regulate interstate highway transport. Aid has been given to air transport by municipalities or other local governments which have constructed the majority of the airport terminals now in use, and public assistance has also been given in other ways. Air transport and carriers are mainly interstate and the Federal Government has, of course, jurisdiction over interstate commerce, but there is apparently no control over routes or charges. While giving due weight to the reasons which have led to Government ownership and operation of railways in other countries, Dr. Emory Johnson is convinced that in the United States the public will continue to be best served by privately-owned railways under proper safeguards. Indeed his unified transportation policy envisages operation under private initiative of other forms of transport also, although he admits that the regulation he desires must be a slow and difficult process, particularly with regard to waterways.

The author shows how the Government regulation of railroads has passed through an early period characterised by legislation mainly corrective and punitive in purpose to a period that began about 1920, during which Government regulation has also had the positive constructive purpose of furthering development. The attainment of this objective of helpful regulation has not yet been realised, and several things still remain to be done. Regulation of motor transport and carriers on highways is still in a state of evolution, but the passing of the Motor Carrier Act of 1935 has undoubtedly accelerated the evolutionary process. On the subject of the waterways, the author trenchantly observes that those who really benefit from their free use constitute only a small part of the public which is taxed to create and maintain them, and that it is no longer the free waterways, but effective Government regulation which safeguards the public against unfair treatment by carriers by rail and road. He asks whether, when there is a surplus of transportation facilities, the present subsidies to carriers or shippers by waterway can be justified. All parts of the unified transportation system should eventually stand upon their own footing. Air transportation is at present in the experimental stage of its development, and the author considers that liberal Government aid to aviation and air transport is at present in the public interest. It is his opinion that, in general, the Federal Government should eventually apply to transport and carriers by air the kind and degree of regulation which is being exercised over carriers by rail and road. The Interstate Commerce Commission is the authority which he considers should be given jurisdiction over the regulation of the several agencies of transportation. With regard to the place of railways in the unified transportation scheme, Dr. Emory R. Johnson makes the interesting suggestion that they should be grouped into 20 systems built around and into the larger existing systems. If this were done, the public would continue to enjoy the benefits of inter-system competition, while the incentive to progress and achievement which is inherent in private ownership and operation would continue to be effective. It might also place the railroads upon a more stable financial basis for the future.

Nationale Verkehrsplanung (National Planning of Transport Facilities) Vol. 3 in a series of *Verkehrswissenschaftliche Abhandlungen* (Scientific Treatises on Transport Questions). By Dr. Sven Helander. Jena: Gustav Fischer. 9½ in. × 6½ in. × 1 in. 440 pp. Paper covers. Price RM. 7·50 net.—This is one of a series of works being issued by the Research Section of the German Ministry of Transport. Its purpose is to review the history of national transport regulation not only in Germany but in practically every country in the world. The author draws on a very large list of works of all kinds—reports, plans and policies—which are in every case quoted, and presents us with a remarkable summary of the position in some 60 countries. His statements are notably free from bias, and have no universal scheme to suit all peoples because it may suit some.

An interesting chapter on the Roman roads and a comparison between them and the German *Autobahnen* is succeeded by an analysis of conditions and tendencies in Germany, in past and present times, for all forms of transport. Other countries are then dealt with, embracing even such places as Tunis and Afghanistan. After considering the part played by large cities as transport centres, Dr. Helander, in the last part of the work, develops the theory of nationally-organised transport. It is a pity that the ultimate objective of transport, however organised, is nowhere clearly specified. The book is written in comparatively simple German, for the author, who is of Swedish descent, has contrived to instil something of the directness of Swedish speech into his language. We would commend his example to other authors who may be moved to compose works on *Verkehrswissenschaft*. This book is well worth reading for its numerous references alone, which reveal a wide range of learning.

Travel in Europe.—The Midland Bank Limited has issued a new edition of its booklet, "Travel in Europe." The work has been entirely revised to date and contains information additional to that given in earlier editions. Its twenty pages, printed in a convenient form for the pocket, are full of essential particulars which make it a useful guide to existing exchange and currency conditions in the European countries most frequented by British travellers. Copies may be obtained without charge on application to the Head Office of the Midland Bank, Poultry, London, E.C.2, or any branch of that bank and its associates.

Polytechnic Tours Programme, 1938.—We have received from the Polytechnic Touring Association Limited, of 309, Regent Street, London, W.1, a 260-page catalogue charmingly illustrated in colours, setting out a multiplicity of attractive tours in Europe. Particularly noticeable is the wide range and variety. As a mark of the popularity of Polytechnic tours, it is pointed out by Commander R. G. Studd that last season twice as many holiday-makers were catered for as in any previous year. As the growth of Saturday traffic had become something of a problem, a third route to Switzerland has been added, *via* Harwich, Flushing, and the Rhine. Facilities available on Tuesdays and Fridays have also been trebled to assist in relieving the pressure.

Travel in Germany.—For the summer tourist season the German Railways Information Bureau has produced a series of descriptive brochures in the same handsome style which we have been accustomed to associate with Reichsbahn productions. These include a new edition of the folder entitled "Travelling in Germany" which gives comprehensive details of all branches of travel facility and even includes about 100 words containing the bare essential German phrases for travel. Another attractive folder is a large map of Germany indicating railways, *Reichsautobahnen*, and shipping routes, and giving on the side a précis of travel information. Separate leaflets deal with the Bayreuth Festival performances, the Munich Festivals, and the International Handicraft Exhibition in Berlin. Obviously this literature was prepared before the *Anschluss*, as the maps do not show the boundaries of Greater Germany, but a separate batch of folders covers both Austria in general and also particular features of travel there.

XUM

THE SCRAP HEAP

Colour harmony is carried to the *n*th degree in a railway station restaurant in Ohio, where only blonde waitresses are allowed in the main waiting room, and only brunettes in the coffee shop.

* * *

The Western Pacific Railroad is the only railway to run over a salt bed; its tracks are laid over salt for eight miles near Wendover, Utah.

* * *

A portrait in oils of Mr. John Taylor, who was associated with Isambard Kingdom Brunel in the construction of the South Wales Railway and the Landore viaduct, is an interesting recent addition to the Great Western Railway Company's historical collection at Paddington. The portrait was the gift of Mr. John Jacob, of Ebley, Stroud, a nephew of Mr. Taylor.

* * *

The Deep Creek Railroad, a subsidiary of the Western Pacific Railroad, has what is probably the smallest general office building of any railway in the world. The headquarters and general office occupy what was formerly a crossing watchman's shanty at Wendover, Utah.

* * *

GRADIENTS

At a public meeting held at Abergavenny on August 18, 1858, to consider the project of a railway between Abergavenny and Merthyr, Mr. Conybeare, one of the engineers to the proposed line, gave the following details regarding steep gradients then in service in various parts of the world. "The Accrington incline, on the East Lancashire railway, has an average ascent of 1 in 42 for a length of two miles. The Lickey incline, on the Birmingham & Gloucester, has a gradient of 1 in 37 for upwards of three miles. The Dainton incline, on the South Devon, has a gradient of 1 in 45. At Halifax there is an incline of 1 in 44, over which twenty-two passenger trains daily, together with heavy goods trains, have run without difficulty or accident for the last 15 years. At Huntsbank, on the Lancashire & Yorkshire, there is a long incline of 1 in 44, over which an excessively heavy traffic has been worked for many years without inconvenience. At Oldham, 8 miles from Manchester, a very heavy traffic, involving half-hourly trains, is worked by the ordinary engines of the line, up an ascent of 1 in 27, ¾-mile long, without the slightest difficulty; it was originally worked by stationary power, but two years ago the rope was found to have no advantage over locomotive power, so locomotives were substituted. At Bradford and at Leeds there are inclines of 1 in 50; and a long list could be given of gradients similar to those above mentioned. All the Yorkshire & Lancashire inclines above enumerated are worked by the ordinary traffic engines of the lines on which they occur, which are found adequate to the duty. There are a great number of similar inclines on the English and Scotch lines, and they are increasing every year; for railways are continually in course of construction through hilly districts in which the construction of railways was formerly considered impracticable; and in foreign and colonial railway engineering much steeper gradients are constantly employed. For instance, the Great Indian Peninsular railway is now ascending from the Bombay coast to the table land of the interior, at two points, by mountain inclines, 14 and 15 miles in length, with a gradient of 1 in 48, with a ruling gradient of 1 in 40, and a maximum gradient of 1 in 37. The Vienna and Trieste railway crosses the Noric Alps by the Semmering inclines, 21 miles in length, with an average gradient of 1 in 47, and a maximum gradient of 1 in 40. The Turin and Genoa railway ascends the Apennines by the Giovi incline, 6 miles in length, with an average gradient of 1 in 36, and a maximum gradient of 1 in 34. The Baltimore & Ohio railway effects its passage across the Alleghany mountains with ascents of 1 in 18 worked by locomotives; and in Virginia, some hundred miles further to the south, the range is crossed by the American Central railway, with similar gradients, also worked successively by single locomotive engines. The locomotives used on these American inclines very closely resemble those employed on the Rhymney valley line in this neighbourhood."

The L.M.S.R. Estate Department administers one of the largest estates in the country, which extends from the River Thames to the extreme North of Scotland and includes Northern Ireland, and represents a rent roll of approximately £1,300,000 per annum, while the total tenancies are about 90,000, which figure includes more than 23,000 houses and cottages, of which about 13,000 are tenanted by railway employees.

"One of the most complicated tasks that we have undertaken," Mr. W. H. C. Clay, the L.M.S.R. Estate Manager, stated recently, "was when the company purchased a church and graveyard in the North of England for a proposed extension scheme. In addition to having to obtain the necessary Parliamentary powers to carry out this work, we were faced with the question of re-burial, and great difficulty was encountered in tracing the descendants of the persons concerned, and carrying out their wishes regarding the re-interment."

* * *

A handsome seven-colour poster recently issued by the Great Northern Railway (Ireland), and entitled "The Valley of the Boyne," has as its dominant feature the reconstructed viaduct spanning the River Boyne at Drogheda (described and illustrated in our issue of November 13, 1936). The artist has chosen a twilight scene, with two figures in the foreground reclining on the river bank, to which pleasant spot they have evidently rowed in the boat moored alongside. The town of Drogheda is framed by the spans of the viaduct, forming a background of deep red against hills seen in an orange light, and a sky of a paler tint.

The famous Boyne viaduct on a G.N.R. (Ireland) poster

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

ARGENTINA

New State Railway Branches Opened

Two new branches of the State Railways were officially inaugurated on April 15, (*a*) from Tostado in the Province of Santa Fé to General Pinedo in the Chaco territory, a distance of 215 km., constructed at a total cost of approximately $18,000,000 paper; and (*b*) from Pie de Palo to Buena Nueva—a station some 7 km. from the City of Mendoza—187 km. long, the total cost of which is estimated at some $27,000,000. This line will eventually join up with the Transandine Railway at Mendoza.

Floods on Several Railways

The last week of March was marked by very heavy rainfall practically throughout the whole of the Republic, with resulting benefit to the pastoral and agricultural zones. Unfortunately, in the Provinces of Santa Fé, Entre Rios and Corrientes, the precipitation, which continued for several days without intermission, was torrential, with the result that much damage was done in some districts to the maize crop which was just being picked. The overflowing of the River Paraná and its tributaries also flooded some of the railway lines in these provinces, traffic working being almost entirely suspended for some days over certain sections. The lines chiefly affected were the Argentine N.E., Entre Rios, Santa Fé Provincial, and the State Railways between Concordia and Villa Federal, and between Santa Fé and Santiago del Estero, on all of which the tracks were submerged between various important points, and embankments washed away. A culvert near La Calandria station on the State line between Curuzu Cuatia and Federal, was undermined by the flood waters, and collapsed just as a passenger train was passing over it, but there were no casualties.

Maize Harvest: First Estimate

The first forecast issued by the Ministry of Agriculture on April 8 puts the production at 4,500,000 tons. This figure—one of the lowest on record—is over 50 per cent. below that for the previous year (9,134,730 tons), and compares still more unfavourably with that for 1935-36 (10,051,000 tons) and 1934-35 (11,480,000 tons); it is also 49 per cent. below the average for the last five years. The chief cause was the prolonged drought, and to a lesser extent the ravages of locusts. The Ministry of Agriculture therefore estimates that the maize exports for the current year will be exceptionally low. It is officially stated that the amount shipped so far this year is only 121,401 tons, the surplus available for export on April 8 being 3,246,174 tons. On the assumption that the whole of this quantity will be shipped before the end of the year, the total exports during 1938 will only slightly exceed 3,367,000 tons as compared with 9,085,057 tons in 1937, a reduction of 5,718,000 tons.

BRAZIL

Brazil-Bolivia Government Treaties

In addition to the protocol signed at La Paz, Bolivia, on November 25, approving the recommendations made by a mixed commission on September 30 last year—reference to which was made in THE RAILWAY GAZETTE of March 11—two treaties were signed at the Brazilian Foreign Office on February 25, one establishing conditions and construction of communication by rail between these two countries, and the other governing the transport and use of Bolivian petroleum.

By the first of these treaties it was agreed to modify Article 5 of the treaty signed on December 25, 1928, in which obligations assumed in Article 7 of a treaty dated November 17, 1903, were replaced by a plan to link Cochabamba to Santa Cruz de la Sierra by rail, with an extension on one side to some port in the basin of the Amazon, and on the other to a port on the River Paraguay at a point which would permit of easy contact with the Brazilian railway system. The modification now made provides for the expenditure of £1,000,000 (gold) in the building of a railway from a point between Porto Esperança and Corumbá to Santa Cruz de la Sierra. This sum will be deposited by the Brazilian Government in some bank in London to be drawn upon every three months according to the expenses incurred. Any further amount necessary for the completion of the construction will be advanced by the Brazilian Government, and be repayable in gold by the Bolivian Government over a period of 20 years with simple interest at 3½ per cent. per annum, or in petroleum placed at Corumbá at whatever price may be ruling in the centre of production at the time. The exploitation of the petroliferous zones opened up by the projected railway will, in fact, guarantee any further loans made in connection with the project.

It is also agreed that in addition to the immediate construction of a railway between Brazilian territory and Santa Cruz de la Sierra, Camiri, and Camiri Sucre, the Bolivian Government, in co-operation with Brazil, will also build a line from Vila-Vila to Santa Cruz de la Sierra and a branch line from this town to Puerto Grether or some other navigable port on the River Ichilo.

The total survey, begun on January 25 last, must be concluded in less than a year, and construction is to begin immediately the survey of the first two sections of 50 km. is completed. Metre gauge will be adopted. Both countries agree to offer all possible facilities for the rapid execution of the project as also exemption from customs duties on all instruments, equipment, objects, and material for staff use.

INDIA

Railways and Commerce

In a resolution adopted at the 11th session of the Federation of Indian Chambers of Commerce and Industry, held at Delhi early in April, the Federation expressed the opinion that many of the recommendations of the Railway Inquiry Committee were unacceptable, particularly the one relating to the company-management of railways. The resolution also protested against the enhancement of freight rates and further observed that any scheme of co-ordination of road and rail transport should not be allowed to restrict or hamper the growth of motor transport.

Bengal-Nagpur Railway Works Programme

The B.N.R. programme for 1938-39 is estimated at Rs. 1·70 crores, including an actual cash provision of Rs. 1·16 crores. The heaviest items in the programme are Rs. 71·84 lakhs for rolling stock and Rs. 57·87 for track renewals.

There are many important works in progress, most of which will be completed during the year, including the replacement and improvement of worn-out signalling and interlocking, improvements at the workshops and general stores at Khargpur, and remodelling of yards. The modernisation of the electric power house at Khargpur is another scheme on which over Rs. 6½ lakhs will be spent.

Hardwar Mela Tragedy

A tragic conclusion marred the success which had attended the organisation of the *Kumbh Mela* at Hardwar. The most auspicious bathing day was April 13, and for several days prior to it, trainloads of devout pilgrims had poured into the city from all parts of the country; the evacuation of this vast gathering began on the 14th. On the morning of April 15, an empty rake, which was being backed into No. 4 *mela* platform for the clearance of passengers, dashed into the buffer stop. The buffer was uprooted and the rear bogie of the rake crashed into the gate of an enclosure thronged with passengers, with the result that six were killed and 36 injured. The injured persons were promptly removed to the Hardwar and Dehra Dun civil hospitals. The East Indian Railway authorities have undertaken to defray all medical and surgical expenses of the injured. Apart from this mishap arrangements for the clearance of the huge

mela traffic continued normally and without interruption.

DENMARK

The Summer Timetable

The summer timetable, introduced on May 15, will be in force until September 19 only instead of until October 5 or 10 as usual. The opening of the Oddesund bridge on May 15 effects a considerable saving in time on the Struer—Thisted line. At the same time the fast diesel railcars which will run on this line, will secure a total saving in time of up to 1¼ hr.; the use of the bridge alone means a saving of about half an hour. The former Swedish locomotives recently bought by the Danish State Railways, have now undergone repair and the necessary alterations for service on the Nyborg—Fredericia—Aalborg route. The doubling of the line all the way from Aarhus to Randers will effect a saving in time of from 10 to 28 min. on this route. The Kronjyden Lyntog between Copenhagen and Aalborg has been extended from Aalborg to Frederikshavn, with stops at Hjorring and Brønderslev, as a result of the opening, on April 23, of the new Limfjord railway bridge connecting Aalborg and Nørresundby. The introduction of several new diesel railcars will also secure an important improvement in the train service on certain lines in western Jutland. There is little change in the speeds of the fastest trains. The fastest run will still be that from Roskilde to Slagelse, 61·6 km., covered by one train in 35 minutes, at an average speed of 65·6 m.p.h. Another train covers the same distance in 35½ min. or at 64·7 m.p.h.

LATVIA

State Railway Results

Of the 3,384 km. of railways open in Latvia, 3,208 km. are owned and worked by the State, and the greater part, or 1,953 km., are of 1·524 mm. (5 ft. 0 in.) gauge (the Russian gauge). The total capital outlay since the Latvian State Railways have been a separate entity is estimated to stand at 407 million lats. Some 54 million lats are said to have been invested in the construction of new lines and 76 million lats in rolling stock. The network has now been further enlarged by the completion, in December, 1937, of the Riga—Rujiena line, and the construction of the Riga—Ergli—Madona—Karsava has also advanced. The principal operating results were as follow:—

	Jan. to Aug., 1937	1936	1935
Passengers ...	11,364,000	14,595,000	13,973,000
Commercial freight, tons	3,317,000	3,329,000	3,075,000
	Lats	Lats.	Lats.
Earnings, gross ...	30,300,000	35,400,000	33,000,000
Expenditure	23,300,000	30,000,000	28,800,000

Passenger fares and goods rates were raised in 1937, to compensate for the increase in prices of fuel and materials. Higher speeds have necessitated a considerable amount of relaying with heavier rails, which, with the rails for the new lines recently constructed, have been imported from Belgium. New locomotives have been acquired in Germany and Poland, but carriages and wagons are now being manufactured locally. The new steel bridge over the river Daugava, between Krustpils and Jekabpils, constructed by Braithwaite & Co. (Engineers) Ltd., was completed at the end of 1936, according to the Report on Economic and Commercial Conditions in Latvia, issued by the Department of Overseas Trade.

SOUTH AFRICA

Harbour Developments: (1) Cape Town

The long-range scheme of harbour development at Cape Town, lately ratified by the Government, is one of the most comprehensive projects ever undertaken. The complete scheme visualised involves a total expenditure of close on £6,000,000 of which an initial expenditure of £2,260,000 has received Parliamentary sanction. [This fact was recorded in the Overseas columns of our issue of March 19, 1937, wherein also the principal works involved were briefly described. Also in our issue of September 17 last, we gave an outline of the reclamation works, including the construction of the new goods yards and of the new passenger station on the site of the existing goods yards, works that are being carried out as a corollary to the harbour development generally.—ED. *R.G.*]

The harbour works will, with normal progress, take about four years to complete, and the whole scheme another four or five years. The contract for the dredging and reclamation work—one of the largest ever let in South Africa—has been awarded to a Netherlands firm whose equipment has already arrived.

(2) Durban

The question of the future development of Durban Harbour as well as the necessity for additional shipping accommodation in the near future has not been lost sight of [as is clear from our reference to the subject on page 353 in our issue of August 27 last.—ED. *R.G.*] An expenditure of £850,000 was recently authorised for major improvement works at the Natal port, which included £620,000 for the provision of two additional deep-water berths. Good progress has been made with the construction of the new berths, but, as a result of the recent phenomenal increase in the volume of cargo dealt with, consideration is being given to a proposal to construct a jetty at the city end of "I" shed, Point, with a view to providing considerable additional deep-water berthage. The jetty scheme, which is strongly favoured by all concerned, will accommodate six large vessels and can be financed by an additional £880,000, taking into consideration the amount already sanctioned for the provision of deep-water berths. A committee, consisting of representatives of the railway administration, Durban Municipality, and commercial, industrial and shipping interests, has now been appointed to go into the proposed jetty scheme as well as the whole question of future harbour development at Durban.

GERMANY

Kruckenberg Railcar Experiments

A new type of articulated railcar designed by Herr Kruckenberg (inventor of the propeller-driven high-speed rail vehicle which attained a speed of 143 m.p.h. on a trial run between Berlin and Hamburg in 1931, and was briefly described in our issue of November 7, 1930), is now being tested on the Reichsbahn. It is constructed of aluminium alloy, weighing only 125 tons, and its two 600-h.p. diesel engines give it a top speed of about 122 m.p.h. The car is 210 ft. long and is carried on four bogies. Permanent seating is provided for 100 passengers, but there are also additional tip-up seats. From its unusual shape and appearance, the car has earned the name of *The Silver Dragon*.

Cheap Tourist Travel in Austria

From May 15 the 60 per cent. reduction in rail fares heretofore granted to visitors to Germany has also been applicable in Austria. The conditions are exactly the same as in Germany, except that a traveller breaking his journey at an Austrian station is required to have his ticket endorsed immediately on alighting. German travel mark cheques and letters of credit have been accepted in Austria since May 1.

Visas for British Visitors

It was announced by the German Embassy in London on May 21 that negotiations between the German and British Governments concerning reciprocal arrangements for visas had proved unsuccessful and that the German Government had therefore decided to follow the lead recently given by the British Government and to introduce visas for British subjects entering Germany (including Austria). As from May 21 holders of British passports have had to obtain a German visa before entering Germany. The cost of this visa is 13s. 6d. for a visa valid for three months, and 27s. for a visa valid for twelve months. A transit visa at a cost of 3s. 6d. is also being issued, but a passenger spending several days and nights in Germany requires a three-month visa. Applications for visas have to be made at the German Embassy, Passport Department, 18, Belgrave Square, London, S.W.1.

XUM

OPERATING THE L.M.S.R.

A summary of the work and achievements of the Operating Department during the past eleven years

UNDER the L.M.S.R. organisation, operating and commercial functions are the charge of Mr. E. J. H. Lemon, Vice-President (Railway Traffic Operating and Commercial). The operating functions of the L.M.S.R. are controlled by the Chief Operating Manager and the commercial functions by the Chief Commercial Manager.

The functions of the Chief Operating Manager of the L.M.S.R. embrace the working of 19,296 miles of lines and sidings (including all arrangements in connection with the safety thereof); the transport of passenger traffic by rail; and the transport of parcels and freight traffic by rail and road throughout from sender to consignee. The responsibility for operation covers points as far apart as Bournemouth in the South of England, and Thurso in the North of Scotland. A staff totalling approximately 122,000 is employed in the Operating Department. The department controls the following rolling stock:—

Locomotives	7,688
Rail motor vehicles	257
Coaching vehicles	23,422
Merchandise and mineral vehicles	281,753
Service vehicles	14,343

The Chief Operating Manager arranges the running and controls the working of approximately 13,500 passenger trains and 16,000 freight trains daily. This involves the running of approximately 235,000,000 engine-miles a year. Approximately 460,000,000 passengers are carried in a year and the goods train traffic conveyed is in the region of 139 million tons, and six million head of livestock.

Changing Conditions

The eleven and a half years during which Mr. C. R. Byrom has been in office as Chief General Superintendent from January, 1927, and as Chief Operating Manager from September 1, 1932, have witnessed constantly changing conditions involving radical adjustment of the operating machine. The decade has seen the development of road competition and the years of depression, entailing the contraction of services and operating activities, which in turn were followed by the recovery in recent years. In passenger traffic, operating problems have been accentuated by the altered habits of the travelling public, who now travel further afield on the average, coupled with the introduction of monthly tickets, available by any train, which have displaced the period excursion ticket issued for travel by specific trains, and the development of evening excursions and evening cruises.

On the goods side modern trade conditions demand next-day delivery of a large proportion of traffic, and one-day goods services are now given between all principal towns and between points as far apart as London and Aberdeen. The internal reorganisation of the railway in 1932, whilst divorcing from the Chief Operating Manager the passenger commercial work, made him responsible for goods terminal operations involving all loading and unloading processes at passenger and goods stations, wharves, docks, canals, and so on; and the cartage of parcels and freight traffic.

Acceleration of Services

Passenger Trains.—The year 1927 saw the naming of the famous Royal Scot express between Euston and Glasgow and Edinburgh. In 1931 a policy of acceleration was instituted, and during the years 1931-1937 inclusive a total daily reduction of 787 hr. 58 min. was effected in the journey time of the trains speeded up. Whereas in 1931 there were no start-to-stop trains of 60 m.p.h. or over, there are now 64 such runs covering an aggregate of 6,401 miles daily. In 1927 the fastest time between Euston and Glasgow was 8¼ hr. The Coronation Scot, introduced on July 5, 1937, today covers the journey between Euston and Glasgow in each direction in 6½ hr., involving a throughout average speed of 61·7 m.p.h. (an average running speed of 62 m.p.h., after allowing for a 2-min. stop at Carlisle). On a trial run of The Coronation Scot between Euston and Crewe on June 29, 1937, a maximum speed of 114 m.p.h. was attained, thereby creating a British maximum speed record for steam trains.

Freight Trains.—As in the case of passenger trains, freight trains have also been speeded up generally. An indication of the measure of this is gained from the increase in the number of fitted freight trains, *i.e.*, trains composed wholly or partly of vehicles fitted with the automatic brake; at the end of 1937 there were 333 such trains, compared with 173 in 1931, an increase of 92·48 per cent.

Punctuality Campaign

The "On Time" movement, which was inaugurated by the publication in December, 1934, of the departmental journal *On Time*, has been an unqualified success and has evoked world-wide interest. Another novel innovation has been "Punctuality Days," that is, the assignation of a day upon which a special drive was to be made to secure 100 per cent. punctuality in train working with a view to securing lasting benefit. On one occasion, out of nearly 13,500 passenger trains in England, Scotland and Wales, no less than 99·3 per cent. were punctual or not more than 5 min. late. Competitions between divisions and districts in connection with the working of express passenger trains, local passenger trains, and freight trains have also been introduced.

Modernisation of Goods Terminals

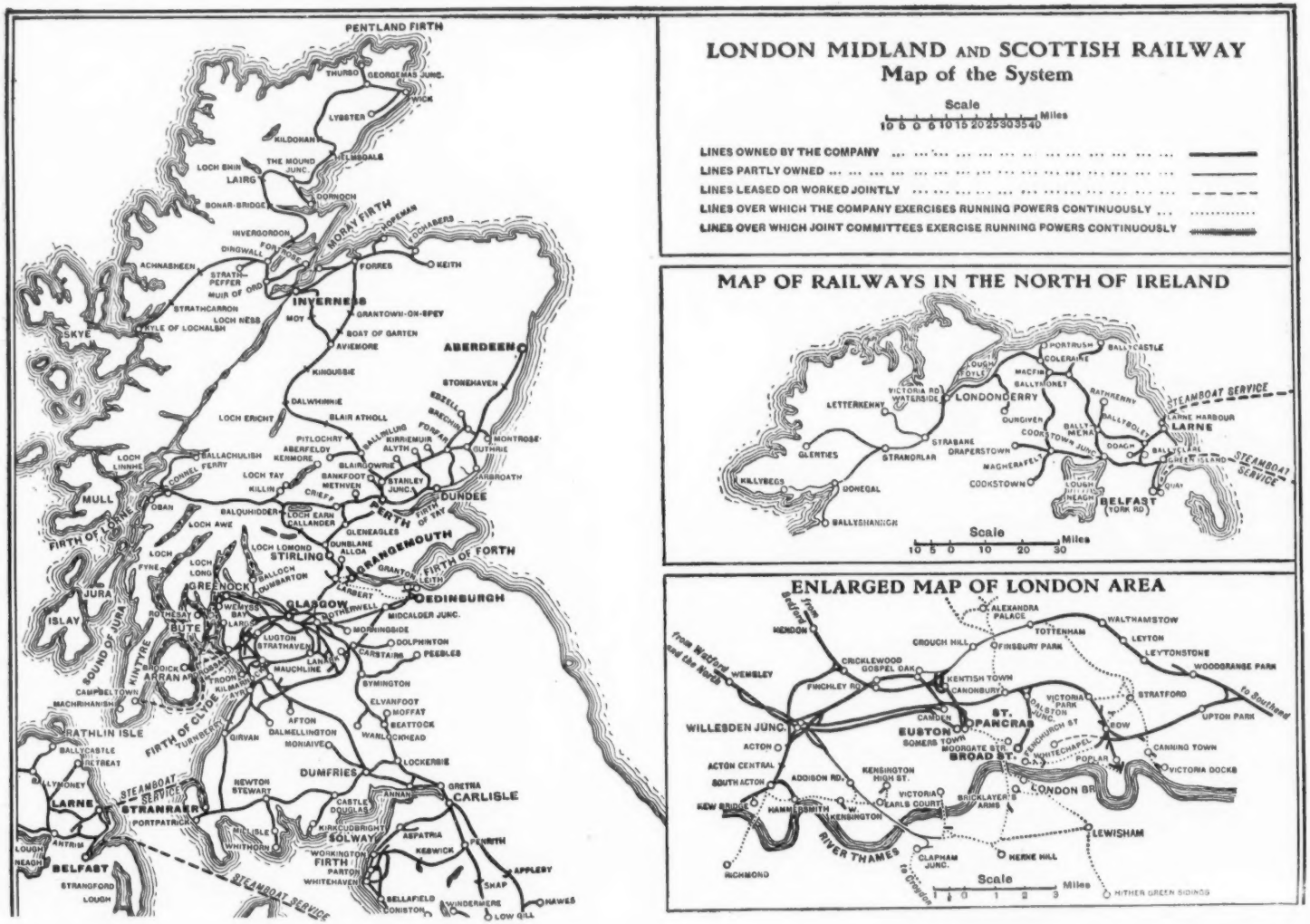
Investigations into the modernisation of goods terminal work to facilitate the handling of traffic and to reduce operating costs were begun in 1933. The L.M.S.R. possesses over 2,000 goods stations, and has to collect, convey, and deliver annually over 28 million tons of merchandise traffic involving well over 111,500,000 consignments. Structural alterations have been made and revised methods of working introduced at a large number of stations, and the benefits accruing are reflected in improved working. The average time occupied in handling 100 tons of traffic loaded or unloaded by the company in 1937 was 119 man-hours, compared with 124 in 1929, although the number of consignments per ton increased by 15 per cent.

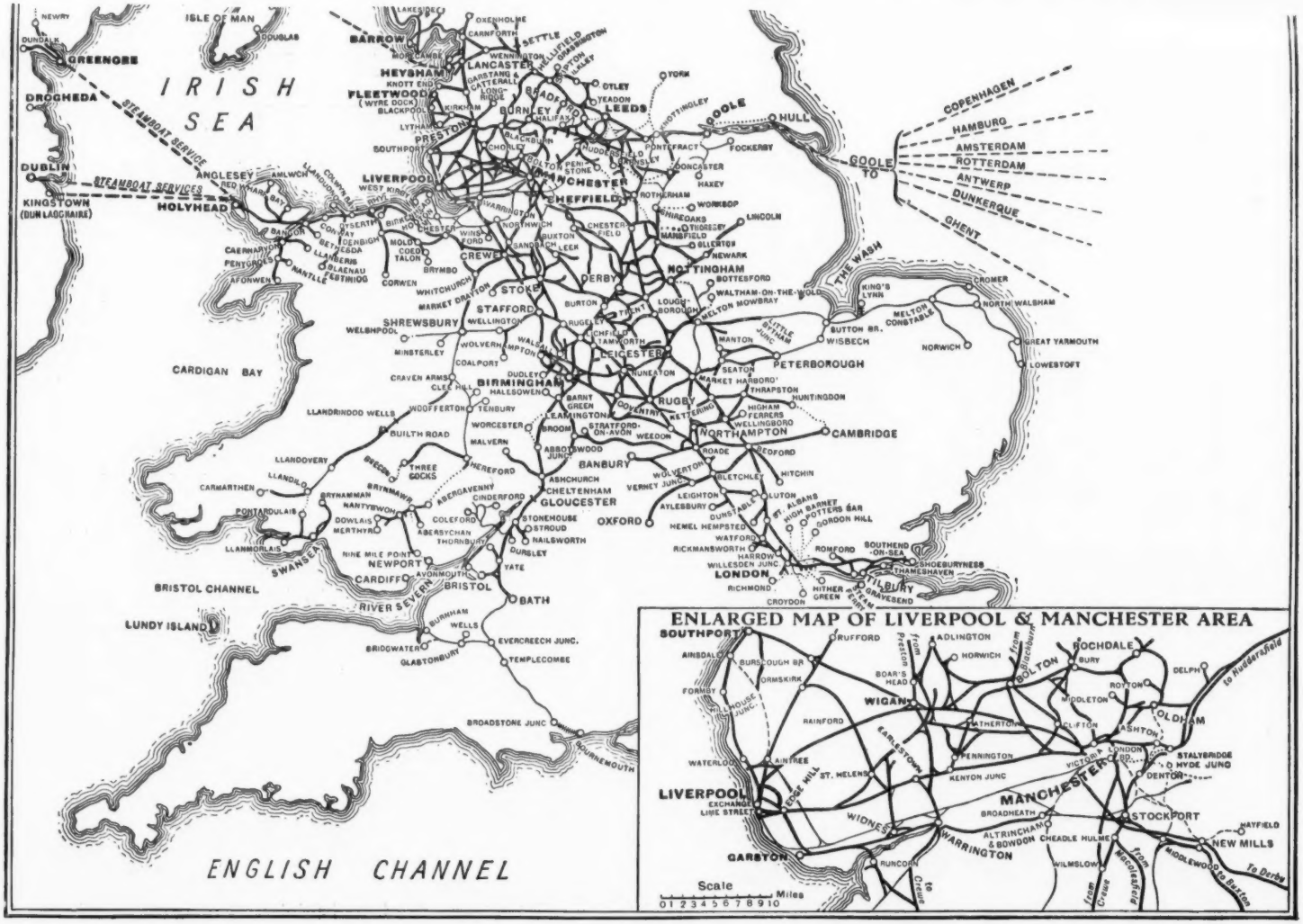
Modernisation of Motive Power Depots

With the object of obtaining a quicker turnround of engines at running sheds by enabling the necessary operations for their preparation and disposal to be speeded up, and by ensuring that these operations shall be carried out in progressive sequence as far as possible, 47 important motive power depots have been modernised during the last few years. Mechanical coaling and ash lifting plants have been installed and alterations made in the layout of the shed yards.

The greater mobility of engines at the motive power depots which have been modernised has, in conjunction

The Extent of the L.M.S.R. System





The Operating Department of the L.M.S.R., over which Mr. C. R. Byrom, C.V.O., is about to relinquish control on retirement, is responsible for 6,870 route-miles of line, carrying 13,500 passenger and 16,000 freight trains daily (the Northern Counties Committee section in Northern Ireland, is not included in these figures, as it has its own Operating Department). Under Mr. Byrom's jurisdiction were 2,391 passenger stations, 2,912 goods stations, 4,136 signal boxes, and 225 locomotive sheds

with other efforts directed towards the economical use of engine power, contributed to a reduction in the number of locomotive units required. Another means adopted of increasing the efficiency and availability of the locomotive stock was the introduction of the Motive Power Area Locomotive Supply, Repair Concentration and Garage Scheme, the principle of which is the selection of a main shed in each area at which to concentrate repairs and examinations for all engines in the area, and to use the other locomotive sheds in the area as garages for serviceable engines only.

Utilisation of Locomotives

The intensive utilisation of locomotives is a subject to which a great deal of attention has been paid with the object of reducing the number of units required to work the railway.

On January 1, 1927, the number of locomotives was 10,159, but by the end of 1937 this had been reduced to 7,688. The effect is reflected in the engine-miles per day per locomotive in use, which between 1927 and 1937 increased 20 per cent. The provision of more powerful engines has assisted in materially reducing the amount of mileage requiring to be worked by two engines. The total reduction effected between 1927 and 1937 amounts to 36·9 per cent. for passenger trains and 61·1 per cent. for freight trains.

Saving of Coaches by Analysis of Workings

Scientific analysis has been applied to the working of coaching stock, and as a consequence although the number of passenger carriages was reduced by 2,829 between the beginning of 1927 and the end of 1937, 11,000,000 more passenger train-miles were worked in 1937 than in 1927.

Units Indicative of Operating Efficiency

A statement is reproduced below giving a comparison of units indicative of operating efficiency under a few headings for 1927 and succeeding years, and under the actual figures for each year the relation to the year 1927 considered as 100 is shown. The figures for 1926 have not been taken as they were upset by the general strike in that year. The statement shows, *inter alia*, that comparing 1937 with 1927:—

		Per cent.
Coaching train speeds	increased	4·01
Freight ,, ,, ...	,,	2·00
Double-heading—coaching	decreased	36·91
,, freight	,,	61·09
Shunting per 100 train-miles—coaching	,,	15·66
,, ,, ,, freight ..	,,	4·78
Wagon-miles per engine-hour ..	increased	7·27
Engine-miles per day per locomotive in use	,,	20·05
Coal consumed per engine-mile—coaching	decreased	1·44
,, ,, freight ..	,,	2·04
Oil consumed per engine-mile	,,	10·68

Royal Trains

Since November, 1926, Mr. Byrom has been in charge of the trains on all occasions on which the King has travelled on the L.M.S.R. The number of such journeys totals 64, covering 17,795 miles. The kings concerned on these journeys were: King George V, King Edward VIII, and King George VI.

L.M.S.R. Operating Units in Relation to the Year 1927 considered as 100

—	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	Percentage improvement in 1937 compared with 1927
Train-miles per train-hour, steam locomotives												
Coaching	13·71	14·00	14·13	14·30	14·41	14·53	14·48	14·51	14·46	14·33	14·26	
Percentage	*100*	*102·12*	*103·06*	*104·30*	*105·11*	*105·98*	*105·62*	*105·84*	*105·47*	*104·52*	*104·01*	4·01
Freight	8·02	8·70	8·43	8·89	9·13	9·66	9·53	9·21	9·09	8·43	8·18	
Percentage	*100*	*108·48*	*105·11*	*110·85*	*113·84*	*120·45*	*118·83*	*114·84*	*113·34*	*105·11*	*102·00*	2·00
Assisting required mileage per 100 train-miles												
Coaching	2·33	1·63	1·72	1·45	1·26	1·29	1·33	1·72	1·32	1·29	1·47	
Percentage	*100*	*69·96*	*73·82*	*62·23*	*54·08*	*55·36*	*57·08*	*73·82*	*56·65*	*55·36*	*63·09*	36·91
Freight	6·99	5·86	6·04	4·78	3·45	2·91	2·93	2·96	2·78	2·80	2·72	
Percentage	*100*	*83·83*	*86·41*	*68·38*	*49·36*	*41·63*	*41·92*	*42·35*	*39·77*	*40·06*	*38·91*	61·09
Shunting per 100 train-miles												
Coaching	9·26	9·15	8·99	8·91	8·89	8·89	8·60	8·30	8·10	7·98	7·81	
Percentage	*100*	*98·81*	*97·08*	*96·22*	*96·00*	*96·00*	*92·87*	*89·63*	*87·47*	*86·18*	*84·34*	15·66
Freight	72·79	70·80	71·16	70·04	68·89	68·33	*68·67	*68·88	*68·61	*69·91	*69·31	
Percentage	*100*	*97·27*	*97·76*	*96·22*	*94·64*	*93·87*	*94·34*	*94·63*	*94·26*	*96·04*	*95·22*	4·78
Wagon-miles per train engine-hour (including assisting and light)	223·88	240·97	238·38	252·14	262·16	274·96	275·18	268·26	267·20	250·03	240·26	
Percentage	*100*	*107·63*	*106·48*	*112·62*	*117·10*	*122·82*	*122·91*	*119·82*	*119·35*	*111·68*	*107·32*	7·32
Wagon miles per total engine-hour ..	113·83	119·08	119·15	123·06	126·78	129·52	130·15	129·03	129·44	124·50	122·10	
Percentage	*100*	*104·61*	*104·67*	*108·11*	*111·38*	*113·78*	*114·34*	*113·35*	*113·71*	*109·37*	*107·27*	7·27
Engine-miles per day per locomotive in use—weekdays	97·81	93·50	94·60	95·18	99·54	102·76	106·77	110·48	115·58	118·14	117·42	
Percentage	*100*	*95·59*	*96·72*	*97·31*	*101·77*	*105·06*	*109·16*	*112·95*	*118·17*	*120·79*	*120·05*	20·05
†Coal consumed in lb. per engine-mile, steam locomotives												
Coaching	52·94	52·99	53·02	51·61	51·32	51·22	51·48	51·50	51·49	52·10	52·18	
Percentage	*100*	*100·09*	*100·15*	*97·49*	*96·94*	*96·75*	*97·24*	*97·28*	*97·26*	*98·41*	*98·56*	1·44
Freight	61·64	60·74	61·82	61·17	61·68	61·16	61·21	60·92	60·45	60·65	60·38	
Percentage	*100*	*98·54*	*100·29*	*99·24*	*100·06*	*99·22*	*99·30*	*98·83*	*98·07*	*98·39*	*97·96*	2·04
†Oil consumed in pints per 100 engine-miles, steam locomotives	6·65	6·37	6·42	6·08	5·58	5·73	5·69	5·73	5·74	5·78	5·94	
Percentage	*100*	*95·79*	*96·54*	*91·43*	*87·97*	*86·17*	*85·56*	*86·17*	*86·32*	*86·92*	*89·32*	10·68

* Includes shunting by diesel engines

† The figures relating to coal and oil consumption have been revised for each year, to bring them into line with the new method adopted by Ministry of Transport from 1936, whereby coal consumed by purely shunting engines is not recorded separately, and oil consumed is not divided between coaching and freight

STANDARDISING POWER SIGNALLING IN ITALY

Electric system adopted, with standard frames built up on unit principle

POWER signalling for a long time found much wider application in Italy than in any other European country, owing to the extensive use made of the Bianchi hydraulic system; there were no fewer than 13,469 levers of this system in service in 1934. All-electric signalling did not make its appearance until 1924, when a 70-lever frame was installed at Sestri Levante, on the occasion of the deviation of the Genoa—Spezia line between that station and Riva Trigoso. Others were afterwards provided at Busto Arsizio, Naples, Rome, Spezia, Venice, Forli, Milan, Fidenza, and at several series of stations on the Rome—Naples and Bologna—Florence direct lines, and other sections, over 6,000 levers being installed in ten years. In order to obtain as much experience as possible several types of apparatus, some of foreign origin, were adopted, although in certain cases the parts were made in Italy to foreign designs.

In due course it was felt desirable to standardise the parts of the electric system, in order to simplify maintenance and renewal work and reduce costs. The staff can be more easily instructed when equipment is of uniform pattern and can use its time and effort to better advantage. First costs could also be reduced, for although the number of installations by any one supplier put in had not, as a rule, been large enough to be of much help in this way, matters would be different if the equipment could be standardised for the whole railway and constructed in quantities, all manufacturers sharing therein. In 1933 the matter was taken in hand. It had, of course, to be dealt with carefully, so as to achieve a reasonable degree of standardisation without hindering further developments. The work was divided into signal box apparatus, circuits, and outside apparatus. The standard locking-frame designs were worked out by 1935 and used for 30 signal boxes on the Rome—Florence line. The individual lever system was adopted—the route setting idea having found little favour in Italy—with miniature lever-type handles, arranged in a single row for frames up to about 50 levers, and in a double row in larger installations. Mechanical locking was retained and indication locking, with positive forcing away of the indication lock armatures and reversal of direction of current through the electro-magnet. There is also an alarm signal to show when points are trailed, in which case a sealed key must be used to effect the restoration of all parts to normal.

The component parts of the standard frame are designed on the unit principle, allowing ready replacement and excluding, as far as possible, the chance of temporary contact being made during the process, or of contact pieces being removed and replaced in the wrong position. Electro-magnets and indicators are provided for all forms of track circuit and control locking, and the general design is neat and compact. Considerable attention has been given to the development of standard circuits, after a thorough study of those used in the various power systems in other countries. This part of the work was studied first, with the object of enabling such circuits to be applied to known apparatus, contractors being required to adopt them and facilitate the application of complete standard apparatus later on. This resulted in a certain number of so-called mixed installations, using standard circuits with non-standard mechanisms.

The general plan followed has been to make circuits outside the signal box proof against false energisation under two simultaneous faults, and those inside proof against one fault, or two whenever possible, using the closed neutral protection principle in most cases, simple circuit interruption sufficing for unimportant subsidiary functions. Circuits have also been developed for track locking, signal reversing, ground frame control, and route locking, covering every requirement likely to be met with, both for semaphore and light signals. At present semaphores are still being much used in power work and a standard signal machine has been developed from a type already in service. However, a new design of point machine was considered necessary, and has already been used where the rest of the work is not of standard type. Standard machines were adopted for all the stations on the Salerno—Battipaglia—Reggio line when it was electrified. Great importance is attached to power signalling in Italy, and care is taken to assist manufacturers to produce equipment at the most reasonable cost. In this way its widespread use is facilitated, thus continuing, with more modern equipment, the progressive spirit which prompted the development of the old hydraulic system and produced such good results with it.

Electrical Book-keeping for Small Offices

The compact electrical book-keeping machine which we illustrate is a production of Burroughs Adding Machine Limited, of Chesham House, 136, Regent Street, London, W.1. It will be seen that it occupies no more space than a typewriter, and has the advantage of possessing a simple keyboard that can be operated efficiently without special training. On this machine ledgers are posted and balanced daily; statements are automatically prepared, and ready for despatch at any time. It can also be used as a fast adding machine. The machine offers the advantage of an up-to-date accounting system for offices where figure work is small, or it can be used to improve departmental efficiency in large concerns.

NEW SOUTHERN RAILWAY SUBURBAN LINE

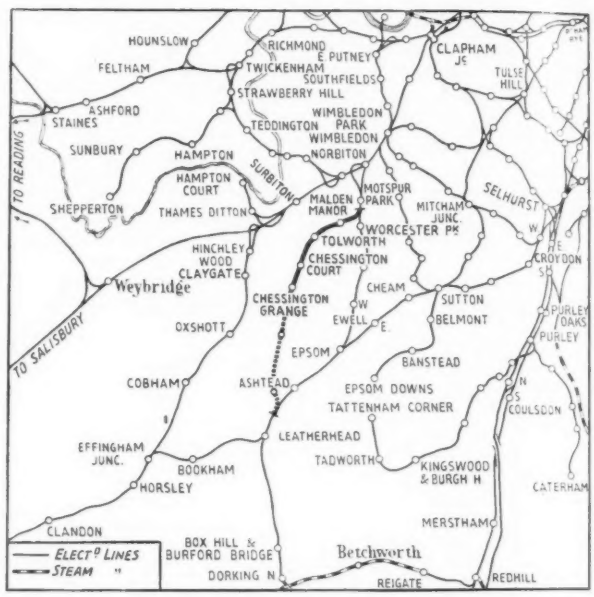
The first section of the new electrified Motspur Park-Chessington-Leatherhead branch is to be opened on May 29, with Tolworth as the temporary terminus

IN THE RAILWAY GAZETTE of February 22, 1935, we published a short article reporting the decision of the Southern Railway board of directors to construct a new line of railway from Motspur Park to Chessington, as a part of the railway authorised in the Southern Railway Act of 1930 to form a loop line from Motspur Park to Leatherhead. The details as then announced have subsequently been altered slightly, but the general alignment selected at that time has been closely followed, and as it will be opened for traffic piecemeal, it has been divided into sections.

As the accompanying map shows, the new line takes off from the Wimbledon—Epsom section of the Southern Railway about half a mile south of Motspur Park station, and its first section, which is now ready for opening, includes Malden Manor and Tolworth stations, the former just short of mile 1, and the latter the temporary terminus, a few chains north of the second mile post. In about a year's time it is hoped to open the second section to Chessington Grange (mile $3\frac{3}{4}$) serving Chessington Court station *en route*; many of the works upon this section are already well advanced. There is no present intention of constructing in the near future the further length of line from Chessington Grange to Leatherhead, a distance of some $3\frac{1}{2}$ miles, but the contractors have been permitted to tip spoil from the cutting at Chessington Grange to form the core of the main embankment for some little distance beyond mile 4, where land has been acquired for the purpose.

The telescopic method of construction is dictated by the rapid southward expansion of the densely populated area, an expansion that has been encouraged by the Kingston by-pass and other road developments. The Malden Manor and Tolworth areas are already ripe for direct rail communication with the centre of London. Less concentrated but rapidly extending is the house-building between Tolworth and Chessington, and a year hence when the line is open to Chessington Grange, this will be a busy centre of population.

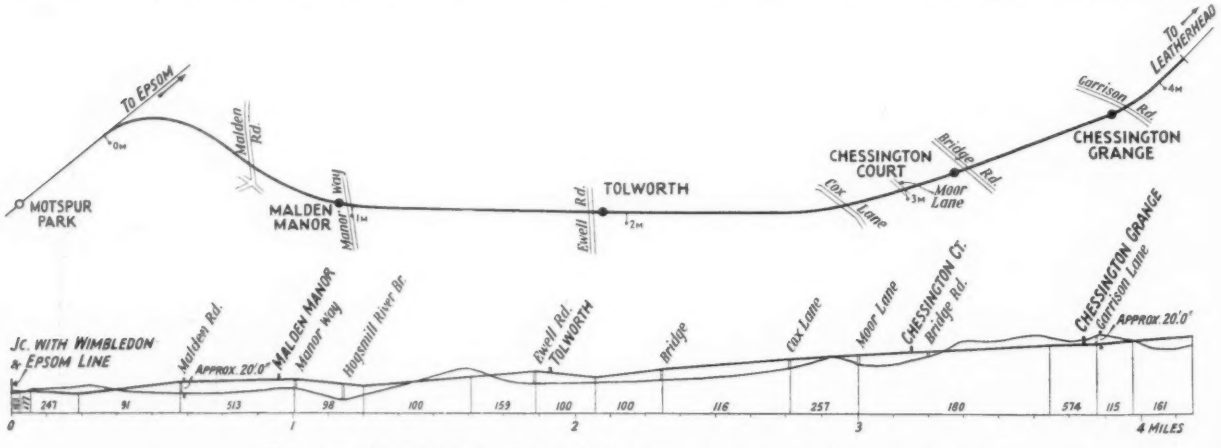
The country traversed is undulating and has a heavy clay subsoil, such that only the cores of the embankment can safely be formed of this material as shown in one of our illustrations. For the same reason special precautions have been taken in the cuttings and these we illustrate, and describe in greater detail below.



Key map showing the position of the new line relative to other sections of the Southern Railway

Earthworks

The longitudinal section of the first two sections, reproduced, shows that there is a majority of embankment, the cores of which have been obtained from cuttings at Tolworth and Chessington. The latter cutting which includes Chessington Grange station yard, is estimated to involve the removal of some 127,000 cu. yd. of clay.



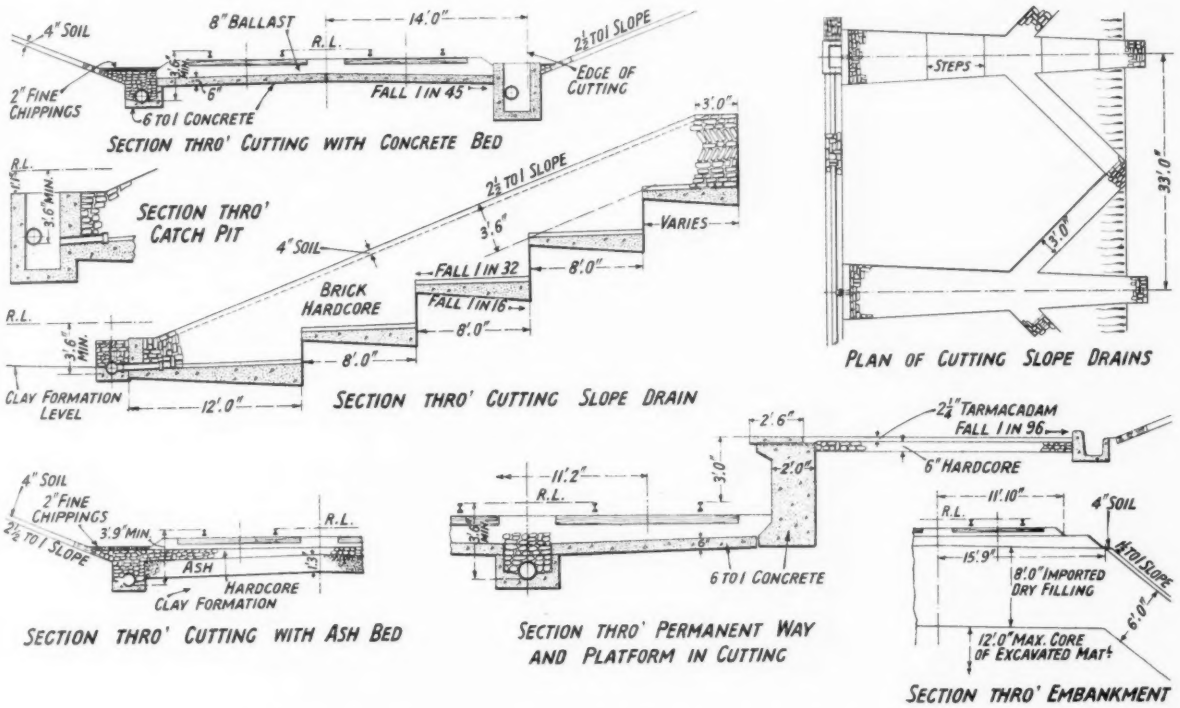
Plan and longitudinal section of the first two sections of the new line

This clay is being run back in narrow-gauge tip-trucks as far as Tolworth, where the station and goods yard require a very heavy fill, the station being on a 20-ft. bank. The overlying dry filling to form the 8-ft. and 6-ft. minimum depths over the core on the top and in the slopes respectively, is being brought by ballast train to Motspur Park, and onwards to site in the same trucks by the contractor's standard gauge engines. It contains a considerable amount of brick rubble and comes mainly from slum clearance areas, so that an excellent bank is provided. The contractor's standard gauge track consists of flat-bottom rails spiked directly to wooden sleepers, and is pushed out ahead of the permanent way, at present from Tolworth onwards. A large quantity of

The drainage in the side slopes of the cuttings is also particularly interesting, as the drawings below show. The frequent stepped slope drains and pipe side drains are designed to ensure immunity from slips. Excessive sulphates in the soil have necessitated the use of *ciment fondu* in all drainage works where there will be running water.

Bridgework

The seven comparatively big underbridges are a feature of this line. Though varying in size and number of spans, all are of the same general type, namely steel plate girder spans encased in concrete, carried on mass concrete piers and abutments. In two of them the foundations rest on piles. Some of the girders have been carried to the site



Details of cutting construction and drainage, and of embankment

clay from the Motspur Park cutting was tipped to spoil on the site of an old ballast pit at Teddington.

The cuttings, as will be seen from the accompanying sectional illustration, have very flat side slopes, 2½ to 1. The large one at Chessington Grange has now been excavated to the extent of about 90,000 out of the total 127,000 cu. yd. Three dragline dredgers are carrying out the main excavation, and a smaller type of machine is doing the final cutting of the main line below the goods yard level. The main lines are here rising at 1 in 115, whereas a reverse grade of 1 in 264 is provided for the goods yard, with the result that at the north end of the latter it is some 10 ft. above the main line.

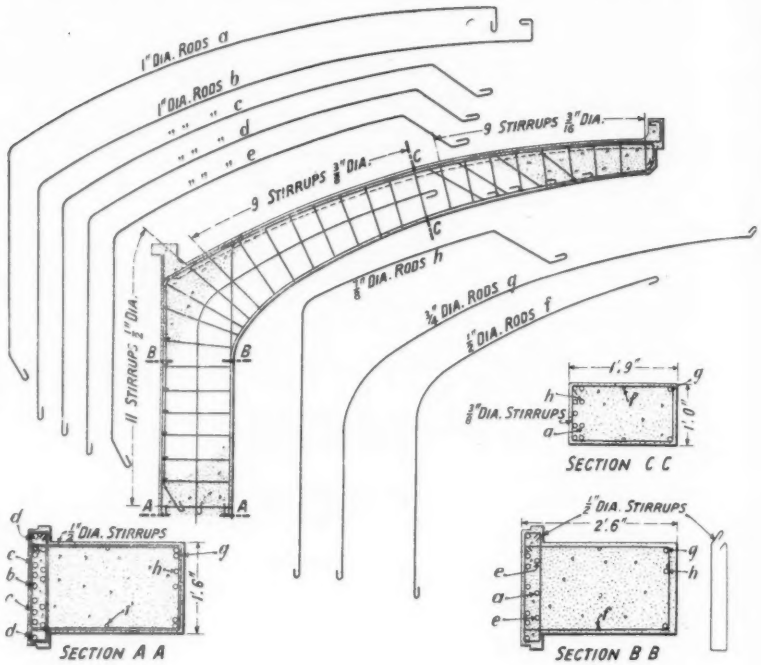
The most striking point in connection with this cutting —and one that has, so far as we are aware, not previously been introduced in this country—is that part of it is to be floored with 6 in. of concrete laid between the side drains and on this the ballast is to be laid. This concrete is sloped downwards from the centre line outwards, except between the platforms which are to be built at Chessington Grange station, the only one in cutting. There a drain is provided in the six-foot way with the concrete sloping down to it.

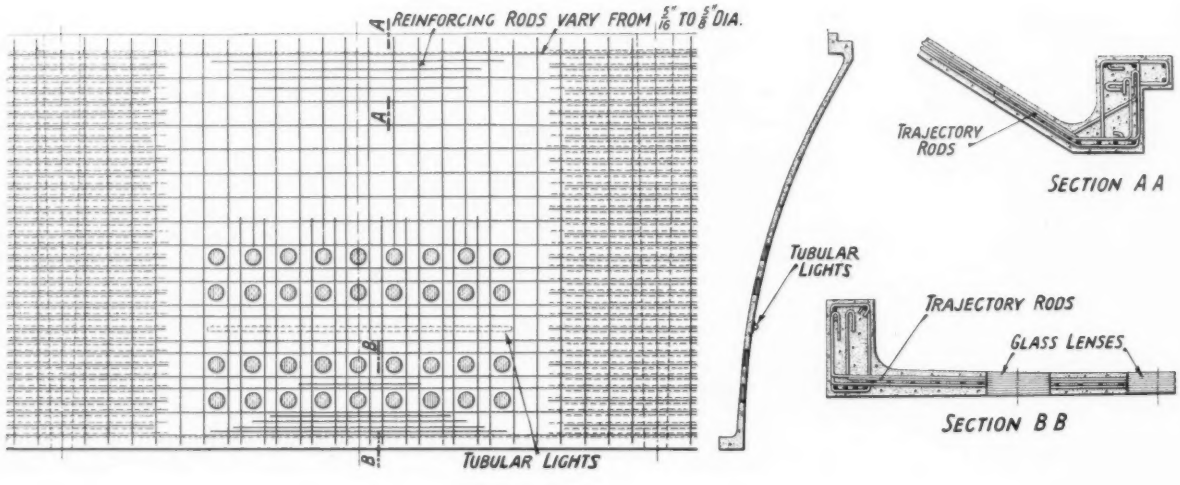
by rail and others by road. Among the latter are those for the new arterial road bridge which are 94 ft. long and weigh 58 tons each. These have just been erected.

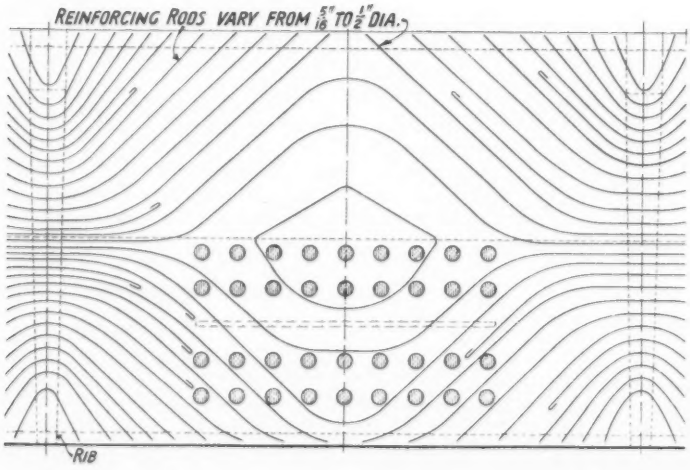
The decking of these bridges consists of transverse joists spaced at 2-ft. centres, with concrete around and between them. Except at Hogsmill River bridge, shuttering for this concreting was suspended, and there is no exposed steelwork at all. In order to complete Hogsmill River bridge as early as possible to enable materials to be carried over it, no shuttering was used in its decking, but pre-cast concrete slabs were placed between and resting on the bottom flanges of the joists, and on to these the concrete was poured; as a result the bottoms of the joists are exposed. The decking is waterproofed with two ⅜-in. layers of bitumen protected from the ballast by 3 in. of concrete, the whole having a slight fall outwards from the centre to facilitate run-off.

In the two-span and three-span bridges a bitumen-filled expansion joint is left in the concreting round the main girders and in the decking over one pier, whereas in the single span bridges one end of the span is fixed and expansion is allowed at the other. The concrete casing round the main girders is added after erection and has

Right: Typical sections through one of the Chisarc reinforced concrete cantilevered frames or ribs, supporting the special platform roofing illustrated below. The base of each of these frames is anchored to a transverse reinforced concrete beam running across to the platform wall, the whole forming a G-shaped member as shown in the illustration on the opposite page

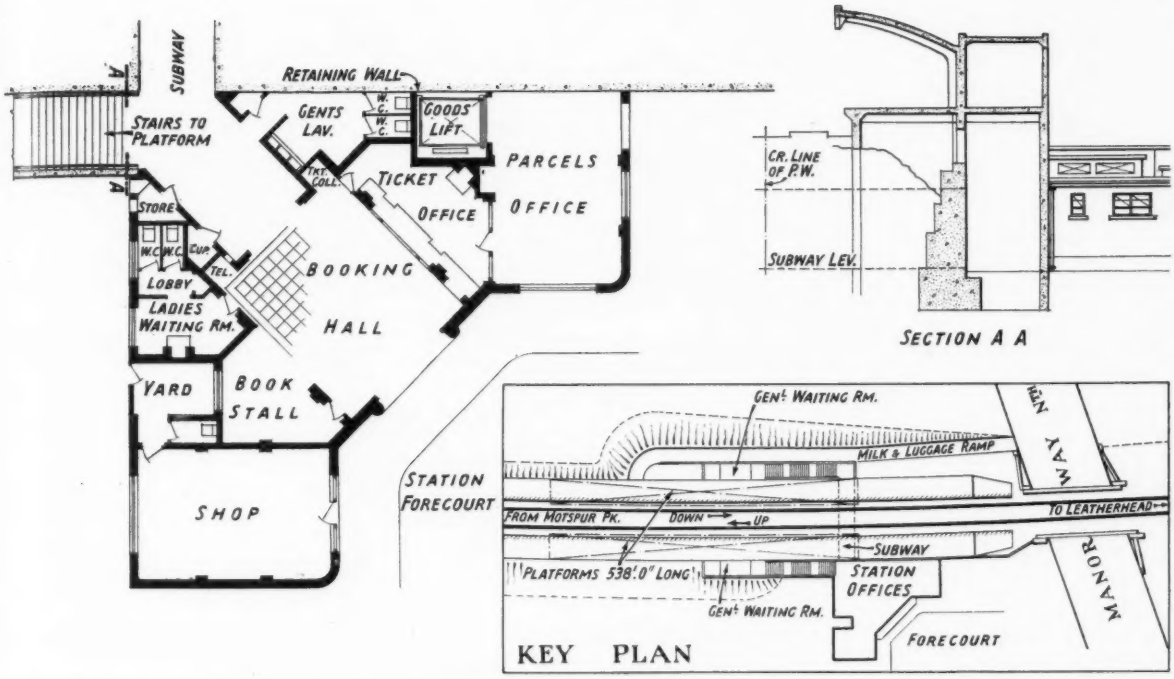






Above (left): Plan of Chisarc platform roofing showing three layers of rectangular reinforcement, glass lenses, and artificial lighting; (centre) section of the roofing, and (right) details of some of the reinforcement at extremities of roof

Left: Plan of the roofing showing the special layer of reinforcement consisting of trajectory rods as arranged relative to the cantilevered supporting frames or ribs



Plan of station buildings; section through platform, platform roofing and stairway; and general layout of stations at Malden Manor and Tolworth; at the latter there is a goods yard in addition

simple horizontal rod reinforcement strung through holes drilled in the web stiffeners and a top and bottom wrapping of expanded metal; it is merely protective.

At Chessington Grange station there is a road overbridge, the foundations and some of the superstructure of which have already been put in. The only other bridges on the first two sections are the station subways and those over the road and footpath giving access to the Surbiton Borough recreation ground. These consist of mass concrete walls and joist and concrete slab tops. At every bridge all the exposed concrete surfaces have an excellent finish secured by the use of plywood linings to the shuttering. The abutments and wing walls are relieved by indented horizontal bands in the concrete giving each structure a particularly pleasing effect.

Fencing and Permanent Way

The Southern Railway has recently standardised a new type of special fencing for its electrified lines where trespassing by children or cattle is likely. It is known as the Corax dropper pattern with chain link attached. This fencing, which we illustrate, is being erected along the new line and should prove very effective.

Permanent way consists of standard Southern Railway 95-lb. track with cast iron chairs held to the sleepers by coach screws, and with two-bolt fishplates, and third rail. Until settlement of the embankment has ceased, cinder ballast will be provided and maintained to level, and later stone ballast will be laid down. Stone ballast has already been laid in Motspur Park and Tolworth cuttings, and on the first embankment at the northern end of the line.

Stations and Station Yards

Malden Manor, Tolworth, and Chessington Court stations are all situated on high embankments and are adjacent to bridges over roads. Opportunity has been taken to continue the bridge wing wall to form a retaining wall above the passenger approach in each instance, as the station buildings are at ground level. Subways to connect the platforms are also integral with this walling extension, and were built prior to the fill being tipped. Platforms, which are of reinforced concrete, and platform roofing are carried on piles at Malden Manor and Tolworth, as some tipping had previously been done there. At Chessington Court, however, concrete piers are used. The platform walling is of concrete, cast *in situ*, and is carried on a continuous r.c. beam supported by piles or piers. The platform edging is of pre-cast concrete slabs. Provision is made for luggage lifts; and staircases, also in concrete, have been constructed.

One of the most characteristic features of this new line is the special Chisarc type of cantilevered reinforced concrete platform roofing, used at Malden Manor and Tolworth stations. On pages 787-8 in our issue of November 5 last, we described another Chisarc railway structure, and although in that case the roofing was not cantilevered and was carried on a different type of frame from that used in this instance, the design of the reinforcement was on the same general principle. The two platforms at each station are 540 ft. long, of which a portion, 200 ft. in length, is roofed. The Chisarc cantilevered frames are carried round under the platforms to the platform walls in the shape of a G and details of them and of the roofing are shown in the accompanying illustrations. It is noteworthy that though the roofing is only about 3 in. thick it has four layers of reinforcement, three consisting of systems of bars at right angles to one another and the fourth of the special Chisarc design illustrated. Expansion joints are allowed in the centre of every second bay between cantilever frames. Small circular glass lenses in the roof are let into the concrete. The station buildings are of neat and attractive design executed in brick, faced with Brizolit, and approached by spacious forecourts. As there is at present no main

drainage at Tolworth, a purification plant has had to be provided.

Station Lighting and Yard Layouts

The lighting of the stations has, in general, been carried out on modern lines, but with a note of simplicity in the fittings. In view of the somewhat unusual concrete roofing to the platforms, a novel type of lighting has been adopted in an attempt to preserve the general lines of the station roofing and to avoid prominent lighting fittings. This has been done by the provision of lengths of fluorescent discharge tubes running the whole length of the roofing parallel with the tracks, two lines of tubing being fixed close together, one of a blue-white colour and the other of a pink-amber colour. The combined effect of the tubes gives a fairly close approximation to natural lighting. The discharge tubes are run at the normal high voltage, and supplied from transformers above the roof, where they are practically out of sight, as is also the low tension supply to the transformers. Simple rectangular electrode boxes at the ends of each section of the tubing form the only visible fittings in addition to the actual tubes themselves.

The stations all consist of up and down platforms outside the tracks, and the alternate ones, Tolworth and Chessington Grange, are equipped with extensive goods yards on the side of the line away from the station buildings. At Tolworth this yard is, like the main line, on embankment and has a similar clay core covered with dry filling; this entails a very heavy fill, which is, in fact, not yet completed. The goods yard at Chessington, as already mentioned, is in cutting. Signals and interlocking are to Southern Railway standards, the former being of the upper quadrant pattern.

Distribution of the Work

The first length of the line including the first cutting and embankment and the Malden Road bridge, was completed by Sir Robert McAlpine & Sons, but the principal contractor for the remainder of sections 1 and 2 is Edmund Nuttall Sons & Co. (London) Ltd. This firm has built Hogsmill River and Ewell Road bridges and is responsible for the whole of the earthworks and drainage and for the concrete works at the stations up to platform level. The imported dry filling is handed over to the firm at Motspur Park junction in train loads and together with all other materials required for its work, is run out over the standard gauge track by Nuttall's own locomotives. A certain amount of carriage of materials for the Southern Railway and for other firms has also been done by Nuttall's engines. In addition, this contractor has a fleet of narrow gauge petrol locomotives and tip-trucks for running out the Chessington cutting spoil to a maximum distance of about 1½ miles in each direction.

Aubrey Watson Limited is responsible for Manor Drive, Cox Lane, Moor Lane, Bridge Road, and Garrison Lane bridges; and the Tees Side Bridge & Engineering Works Ltd., is supplying and erecting the steelwork for all the bridges built by this firm. The Butterley Co. Ltd. supplied and erected the steelwork for the bridges over the Hogsmill River and Ewell Road, and Dorman Long & Co. Ltd. was the contractor for the steelwork of Malden Road bridge. Station buildings at Malden Manor and Tolworth have been built by F. G. Minter Limited, and the Chisarc work, for which the working drawings were prepared by Architectural Services Limited—holder of the patent rights—has been carried out by G. T. Crouch Limited. The fencing is being supplied and erected by J. B. Corrie & Co. Ltd., and the purifier at Tolworth is the product of Tuke & Bell Limited.

Operation

For passenger working as far as Tolworth, the electric trains now terminating at Motspur Park will be extended to the former station where they will use the down platform for both arriving and departing passengers. On leaving they will run over a cross-over on to the up line. A single siding will be provided in the first place in the goods yard for public traffic, others being required for construction purposes. But eventually the layout will consist of seven sidings capable of accommodating 218 wagons, and will include extensive cart roads and a goods shed approximately 84 ft. × 32 ft. with office attached. No goods accommodation is provided at either Malden Manor or Chessington Court stations. The passenger service to Tolworth will consist of three trains an hour, stopping at all stations from Waterloo, and *vice versa*; a small quantity of additional rolling stock will be required.

The whole of the work above described has been designed and carried out under the supervision of Mr. George Ellson, Chief Engineer, Southern Railway.

Deodand

In accounts of early railway accidents involving loss of life, reference is often made to the levying of a deodand on the wagons, and in fact two or three examples are quoted by Canon Reginald B. Fellows in his "History of the Canterbury and Whitstable Railway." For over 90 years the term deodand has been obsolete, as an Act of 1846 abolished the custom and stated that the law respecting deodands was "unreasonable and inconvenient." The word, which of course means "to be forfeited to God," was the legal description of the custom whereby whatever personal chattel was the immediate occasion of the death of a human being was forfeited to the Crown to be applied for charitable purposes, though not necessarily in aid of the relatives of the person killed. In the course of years the legal authority who decided the charitable purpose to which the forfeited article (or its value) should be applied changed more than once, and at the beginning of the railway era the duty devolved on the Coroner's jury to assess the value of the article. Sometimes a nominal sum was named, but at other times the jury went to the opposite extreme, as in 1839 when a deodand of £1,400 was levied upon an engine belonging to the Stockton & Darlington Railway.

A Useful Waterproofing Material

A liquid waterproofing and adhesive material, is Synthaprufe, claimed to be the simplest, most economical, and most effective way of curing and preventing dampness in walls and roofs. After application, Synthaprufe sets into a rubber-like film, impervious to water, and of sufficient elasticity to allow for normal expansion without cracking. After it has been brushed on, it penetrates even hair cracks in concrete or brick surfaces, and is unimpaired by variations of temperature.

Leaks in gulleys, guttering and piping can be repaired by treating the defective places with Synthaprufe. When inside walls are treated, wallpaper or distemper may subsequently be applied, provided that certain simple instructions are followed.

Athough primarily intended to be used as a waterproofing material, Synthaprufe has adhesive qualities and is extensively used for laying linoleum on either wood or concrete floors. Not only does it fasten the floor covering securely, but is claimed also to prevent rotting from damp. As an adhesive for external work it is said to withstand the worst weather conditions.

Synthaprufe is manufactured by Powell Duffryn Associated Collieries Limited.

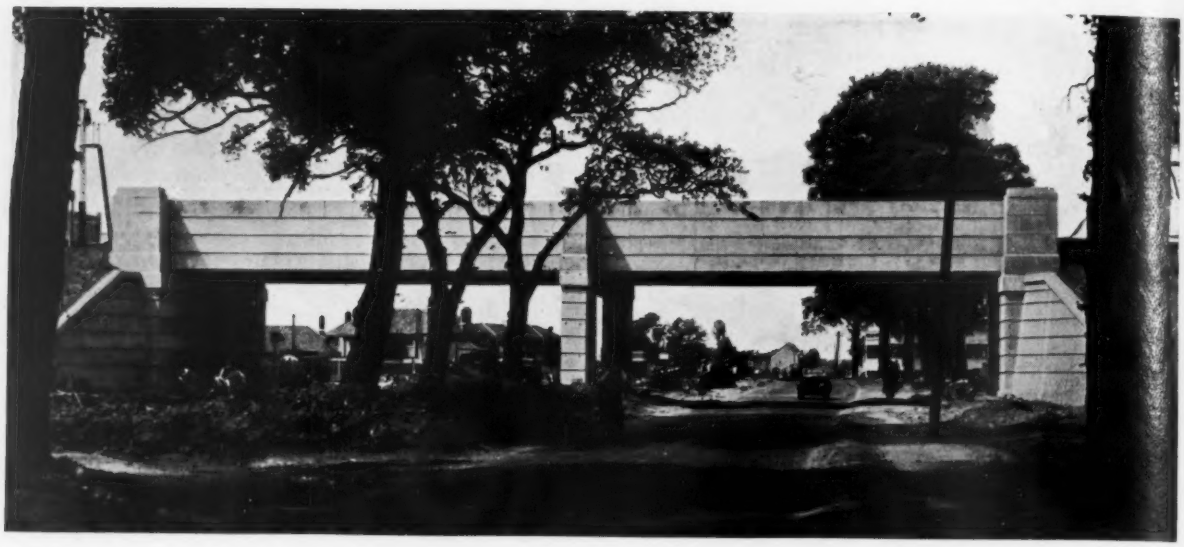
XUM

Above: Main entrance to the station, the platforms of which are on the embankment on the right

Left: Platforms with Chisarc reinforced concrete awnings, free from pillars. Note the fluorescent lighting system

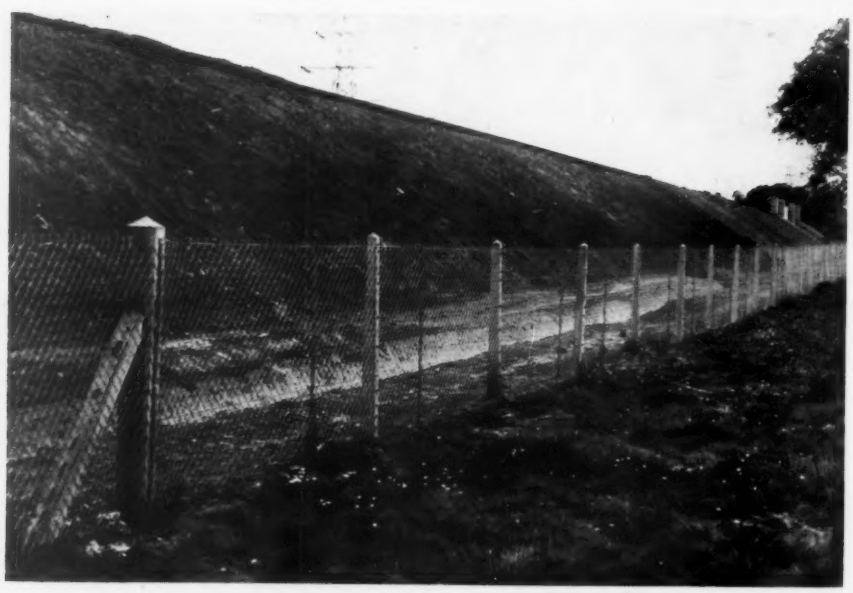
MALDEN MANOR STATION, S.R.

(*See article on page* 1020)



Above : Double-span bridge over Ewell Road

Right : Bridge over Malden—Worcester Park Road



Left : New protective diamond mesh fencing

SOUTHERN RAILWAY NEW SUBURBAN LINE TO CHESSINGTON

(*See article on page* 1020)

JUNCTION INDICATORS IN COLOUR-LIGHT SIGNALLING

New five-light type to be used on the L.N.E.R.

ABOUT four years ago, in an endeavour to find a simple and distinctive method of signalling the route at junctions equipped with colour-light signalling without using splitting signals, the L.N.E.R. (North-Eastern Area) installed the first experimental junction indicators at Thirsk; they consisted of neon tubes of a deep orange colour. After inspection by officers of the Ministry of Transport and consideration by the railway companies further experiments were made with a view to finding a more satisfactory colour, sufficiently distinct from the ordinary signal colours and visible at adequate range. Lunar white was eventually selected and the first application of junction indicators in that colour was in the Waterloo—Hampton Court junction signalling of the Southern Railway (the first part of which was described in our issue of May 29, 1937), where they have given every satisfaction.

The L.N.E.R. has since developed its own design for these indicators, as seen in the accompanying illustrations, and it has been decided to instal them in the new work between Northallerton and Darlington and in the 4½-mile area round York station, which is being re-signalled.

The indicators used on the S.R. have three lights per indication, as has the one in the Southern Area of the L.N.E.R. at Hall Farm junction, illustrated on page 837 of our issue for April 29 last. Those adopted in the North-Eastern Area, however, have five 5-in. dia. lunar white lights, each given by a 12-volt 14-watt double-filament lamp behind a special clear toric lens and cathedral-blue glass screen, hooded as usual, fixed in an aluminium alloy case with background and sighting device (Fig. 1) having a hinged gasketted door carrying two independent backlights, illuminated in parallel with the centre front unit when the door is closed. The transformer housing can carry two indicator aspects on each side, no third lower quadrant position being as yet necessary. For the direct route, of course, no indicator aspect is shown. Ball and socket fixing is provided, permitting of perfectly variable adjustment for sighting, with suitable locking screws. Spare sockets are covered by a watertight hatch cover. The indications are visible at over 1,000 yd. in bright sunlight and in no case merge with the signal aspect in darkness below 800 yd.

Fig. 1 (left)—Down main outer home signal at Thirsk, fitted with new junction indicator. Fig. 2 (centre)—Rear view of down main outer home signal at Thirsk, showing interior of indicator. Fig. 3 (right)—Up main direction signal at Thirsk, fitted with new two-way junction indicator

When sighting permits, junction indicators will be fixed above the colour-light signals, but the arrangement seen in Fig. 3 was necessary on account of local conditions.

When a junction aspect appears the signal at that location usually shows yellow, and the one in the rear double yellow; but for the right-hand route governed by the signal in Fig. 3 a delayed green is given, owing to a rising gradient ahead and a curve giving limited sight of the signal in advance. Suitable circuit controls provide that a signal cannot be given for a diverging route unless the junction indicator functions correctly.

This large application of junction indicators, resulting in the simplification of colour-light signal aspects and elimination of unnecessary red lights, which is much appreciated by enginemen, is likely to prove a step in the standardisation of light signalling indications in this country.

XUM

MILLING LOCOMOTIVE AXLEBOXES

Work performed on duplex milling machine in Crewe works, L.M.S.R.

THE illustration herewith shows cast-iron axleboxes for locomotive tenders being milled at the Crewe works of the London Midland & Scottish Railway, on a 48-in. Archdale duplex milling machine. The cutters are of 6-in. dia. and have 16 teeth tipped with Wimet. The roughing cut is carried out at a speed of 106 r.p.m. with a feed of 2½ in. per min., and depth of cut ¼ in. The finishing cut is effected at a speed of 106 r.p.m. with a feed of 4 in. per min. and 1/32 in. depth of cut. It is necessary to pass the cutter through twice, for roughing and also for finishing.

In our view showing the machine in use, the cutter can be seen operating on the base of the slide, and at the conclusion of this cut the spindles are raised to deal with the top portion of the slides; a similar procedure being adopted for the finishing operation. Steel axleboxes are also dealt with on this machine, and cutters for this work can be seen at the base of the switchbox on the left-hand side of the same view.

Archdale duplex milling machine in operation at Crewe

A distinguishing feature of this machine is that it is fully electrically controlled. Clutches for engaging, disengaging, and reversing the feed and quick table traverses have been eliminated, these being liable to wear, whilst if shock is to be avoided their engagement limits the possibility of high speed for quick traverse. The table cycle of the machine is controlled by starting, stopping, and reversing squirrel cage motors, and this has allowed the quick traverse rate to be raised from 150 to 240 in. per min. Reversible table quick traverse is by a separate motor through a centrifugal coupling to the screw. When the quick traverse is stopped, a brake is applied to the quick traverse drive. This prevents over-run where quick traverse is followed by feed. The feed and quick traverse drives are mounted on anti-friction bearings, and the gears are hardened.

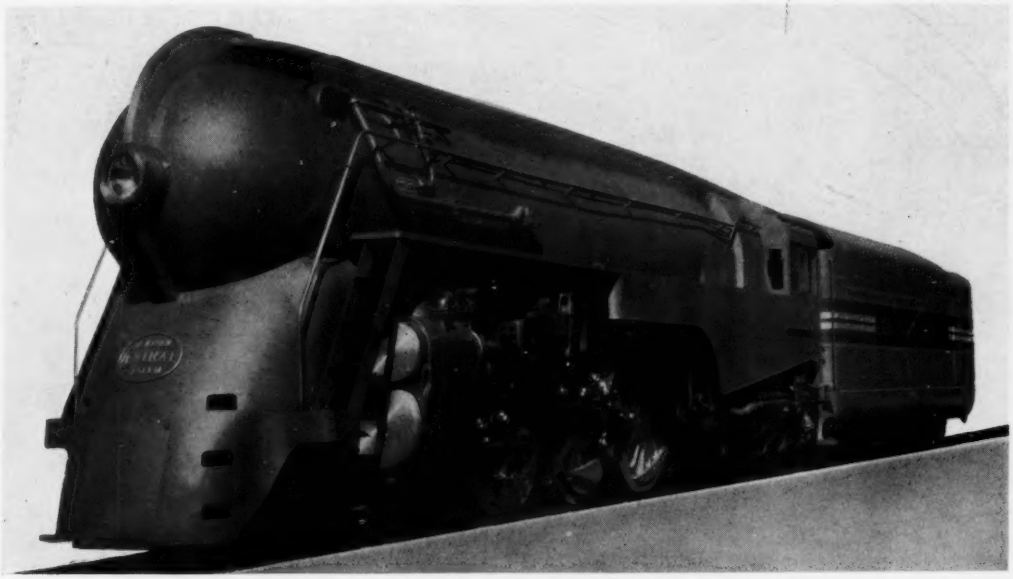
Steam Locomotive-Worked "Tramways" in Holland

An example of the railway-type locomotives and rolling stock used on some of the so-called steam "tramways" of Holland. The Ede-Wageningen line illustrated (from a photograph by Dr. H. A. Whitcombe) now handles goods traffic only, passenger service being provided by buses

(*See editorial note on page* 1007)

IMPROVED 4-6-4 LOCOMOTIVES FOR THE NEW YORK CENTRAL

Fifty new Hudson type locomotives have recently been delivered to the New York Central System of America, ten of which are streamlined for operating the Twentieth Century Limited



OF 50 new Hudson 4-6-4 type locomotives delivered by the American Locomotive Company in recent months to the New York Central System and classified J-3a, ten are streamlined for the purpose of working the Twentieth Century Limited express between New York and Chicago, for which new streamlined rolling stock is shortly to be delivered.

The new engines are of the same general design as the earlier J-1 class, the first of which was delivered in 1927, but with certain important modifications. The following are their leading dimensions:—

Cylinders, dia. and stroke	22½ × 29 in.
Piston valves, dia.	14 in.
Maximum travel	8½ in.
Steam lap	1⅝ in.
Exhaust clearance	3/16 in.
Lead	¼ in.
Wheels, dia.:	
Driving	79 in.
Front truck	36 in.
Trailing truck	36 and 51 in.
Boiler:	
Steam pressure	275 lb. per sq. in.
Dia., largest, outside	91½ in.
Grate area	82 sq. ft.
Heating surfaces:	
Firebox and combustion chamber	323 sq. ft.
Arch tubes	37 ,,
Tubes and flues	3,827 ,,
Superheater	1,745 ,,
Comb. evap. and superheater	5,932 ,,
Tractive force, engine, 85 per cent.	43,440 lb.
Total tractive force with booster	55,540 ,,
Weights in working order:	
On coupled wheels	87½ tons
Total engine	160¾ ,,
Tender	140¼ ,,

As compared with the original design the new locomotives have a combustion chamber, and the tubes are 1 ft. 6 in. shorter, or 19 ft. in length, giving a correspondingly reduced superheating surface, though in such a way that actually the temperature of the superheated steam is 30° to 40° F. higher than before. The boiler pressure has been raised from 225 to 275 lb. per sq. in. Other features are a coned boiler barrel and completely welded inside firebox. Four arch tubes carry the brick arch, and a mechanical stoker feeds the coal into the firebox from a coal pusher on the tender. Steam separators are inserted on the steam pipes, and the regulator is of the multiple type built into the superheater head.

The cast steel frame incorporates the cylinders, and the wheels are mounted on Timken roller bearings, except those of the tender, which have SKF bearings. Boxpoc type driving wheels are used on 25 of the locomotives and Scullin disc type on the others. On five of the streamlined locomotives Timken roller bearing rods and crank pins are used, and all the locomotives have pistons, piston rods and cross-heads of Timken design and special alloy steel which results in a considerable reduction of weights in the reciprocating parts. The maximum hammer blow at 90 m.p.h. is calculated to be only 3½ tons. The locomotives have long-travel piston valves actuated by Baker valve gear. Aluminium alloy and Cor-ten steel have been largely used on these locomotives, and those that are streamlined weigh only 2½ tons more than the others. The 12-wheeled tender carries 14,000 gallons of water and 30 tons of coal.

On test the new locomotives have developed a maximum of 4,700 i.h.p. at 80 m.p.h., and 3,880 b.h.p. at 65 m.p.h. These figures compare with 3,950 i.h.p. at 65 m.p.h., and 3,200 b.h.p. at 57½ m.p.h. developed by the earlier locomotives. They have also given an evaporation of 63,000 lb. per hr. compared with 57,500 lb. per hr. of the J-1 locomotives on a consumption of 5,500 lb. of coal. At 8,250 lb. of dry coal per hr. the J-3a locomotives have given an evaporation of 89,000 lb. as compared to the 81,000 lb. for the original engines. Whereas the latter consumed approximately 4 lb. of coal per drawbar horsepower, the new ones consume from 3·25 to 3·4 lb. at 2,300 and 2,000 d.b.h.p. respectively.

XUM

Mr. C. R. Byrom, C.V.O., O.B.E., retiring Chief Operating Manager, L.M.S.R., at the conclusion of his 64th and last royal train journey on the L.M.S.R. system, receives the congratulations of Sir Josiah Stamp, Chairman of the company. It was during this journey with the royal train that Mr. Byrom was invested by the King with the C.V.O., as recorded opposite

Mr. Byrom takes leave at Euston of the driver of the royal train, in which he accompanied the King and Queen during their tour of Lancashire last week

Mr. J. B. Dunkley, Stationmaster at St. Pancras, L.M.S.R., adding his own good wishes to those contained in the sheaf of telegrams held by Miss Eileen Topham (the Railway Queen), when she left St. Pancras for a visit to Stockholm

RAILWAY NEWS SECTION

PERSONAL

The King received Mr. C. R. Byrom, whose retirement from the post of Chief Operating Manager, L.M.S.R., is announced on this page, on the royal train at Ashton-under-Lyne on May 20, and invested him with the insignia of a Commander of the Royal Victorian Order. The investiture took place in the course of Their Majesties' tour of Lancashire, the last of many occasions upon which Mr. Byrom has been in charge of royal train journeys on the L.M.S.R. Mr. Byrom was also presented by the King with a pair of gold cuff links.

We understand that Mr. J. P. Thomas, General Manager (Railways), London Passenger Transport Board, is retiring at the end of June. For the time being no successor is being appointed, and the Operating Manager (Railways), and the Chief Mechanical Engineer will be responsible directly to the Vice-Chairman.

Mr. P. C. Quilter has been appointed a Director of the British Electric Traction Co. Ltd., in succession to the late Viscount St. Davids.

A tribute to Sir Henry Chapman, who has retired from the general managership of the Rhodesia Railways, was paid by the Chairman, Mr. Arthur E. Hadley, at the general meeting of the company on May 18. Mr. Hadley said he could not let the occasion pass without expressing great admiration and gratitude for Sir Henry Chapman's work during the world-wide depression of 1931 to 1933, when he maintained successfully efficient services out of materially reduced revenues, and for the important negotiations he concluded last year with the Union and Rhodesian Governments and the Northern Rhodesia copper companies which enabled the company to make the highly successful debenture conversion scheme. They were greatly indebted to Sir Henry Chapman for his great share in putting the Rhodesia Railways in the sound and efficient condition in which they were today.

Mr. Hadley also announced that Sir Henry Chapman would shortly take up the position of Technical Adviser in London to the railways.

Mr. C. R. Byrom, C.V.O., O.B.E., who, as recorded in our issue of April 1, will retire at the end of this month from the position of Chief Operating Manager, L.M.S.R., was educated at Shrewsbury, and entered the L.N.W.R. service in 1896. After serving in various departments he became Assistant District Traffic Superintendent, Central Wales and Swansea, in 1907, and Southern Division in 1911. In 1918 he was promoted to be Assistant Superintendent of the Line, and when amalgamation took place he became General Superintendent (Passenger Commercial), L.M.S.R. In 1924 Mr. Byrom was selected for the post of Assistant Chief General Superintendent. He became Chief General Superintendent in 1927, and was appointed Chief Operating Manager in 1932. Mr. Byrom has been Chairman of the L.M.S.R. Company's side in the negotiations with the L.N.E.R. and G.W.R. Companies in regard to pooling. An editorial article on his career will be found on page 1008, and an account of the work and progress of the department over which he has presided on page 1015.

Photo] ***Mr. C. R. Byrom, C.V.O., O.B.E.*** [Vandyk
Chief Operating Manager, L.M.S.R., 1932-38

Mr. W. S. Robinson, Assistant Divisional Controller (Passenger Services), Central Division, Manchester, L.M.S.R., will retire on May 31 after 47 years' railway service. Mr. Robinson joined the former Lancashire & Yorkshire Railway in April, 1891, as a Train Recorder at Manchester Victoria station, and later succeeded to the position of Station-master's Clerk at that station. In 1902 he was attached to the Headquarters staff of the Lancashire & Yorkshire Railway at Manchester in the Passenger Trains Section. Consequent upon the grouping of railways in 1923, Mr. Robinson was in 1924 placed in charge of the Passenger Trains Department, L.M.S.R., and when subsequent internal changes were made, was appointed Assistant Divisional Controller of Passenger Services. Mr. Robinson is succeeded by Mr. R. Howard, of Manchester, who for a number of years has been an Assistant to the Divisional Controller, Rolling Stock, Central Division.

Colonial Office Appointments

The Secretary of State for the Colonies has recently approved the following appointments:—

Mr. A. T. G. Power (Assistant Works Manager), to be Works Manager, Gold Coast Government Railway.

Mr. B. D. Rampala (Junior Assistant Mechanical Engineer), to be Assistant Mechanical Engineer (Locomotive), Ceylon Government Railway.

Dr. Otto Senn, General Manager of the Royal Hungarian State Railways, will retire at the end of June for health reasons, and will be succeeded by Herr Kornel von Lanér, at present Deputy General Manager. Dr. Senn, who was born in 1879, entered the State Railways' service in 1900. In 1930 he became Deputy General Manager, and succeeded Herr von Samarjay as General Manager not long after. Dr. Senn has established very close co-operation between the commercial world and the railway management, and has also been active in promoting co-ordination with the road motor industry. He introduced house-to-house transport methods, and promoted the State purchase of the light railways.

His successor, Herr von Lanér, was born in 1883 and entered the Mechanical Engineering Section of the State

XUM

Railways in 1905. Becoming Chief of that section in 1931, he was appointed Deputy General Manager three years later. His name is associated with several designs of locomotive, the introduction of electric traction between Budapest and Hegyeshalom, and numerous railcar services. He has been long associated with the technical committee work of the Central European Railway Association.

Mr. V. L. Dean, V.D., M.Inst.T., Resident Manager of the Indian Railways Publicity Bureau in New York, will be visiting this country in July prior to returning to India in September, it having been decided to close the bureau at the end of June. This decision, as explained in an editorial

From *The London Gazette* of May 13: Supplementary Reserve of Officers, Royal Engineers, Transportation: Captain George Sydney Bellamy, late R.E., to be Major (May 14).

From *The London Gazette* of May 20: Supplementary Reserve of Officers, Royal Engineers, Transportation: Col. Sir Herbert A. Walker, K.C.B., T.D., having attained the age limit, relinquishes the appointment of Honorary Colonel (May 16).

Mr. J. Harvey Gardner, who, as recorded in THE RAILWAY GAZETTE of May 20, has retired from the post of Chief Mechanical Engineer of the Tanganyika Government Railways, served from October, 1916, to March, 1919, as Assistant Locomotive Superintendent, East African Military Railways. In April of the latter year he became Assistant Locomotive Superintendent, Tanganyika Government Railways, which post he held until promoted to the rank of District Locomotive Superintendent in March, 1930. In 1932 the Locomotive Department of the Tanganyika Government Railways was reorganised, and in June of that year Mr. Gardner assumed the duties of Locomotive Running Superintendent until January, 1933, after which he continued as Works Manager, Dar-es-Salaam, until appointed Chief Mechanical Engineer in February, 1936.

Canadian Pacific took over the Elder Dempster Atlantic fleet in 1903. In November, 1919, he was appointed Marine Superintendent at Liverpool, and after further commands at sea, culminating in that of the *Empress of Scotland*, he was appointed General Manager of the Canadian Pacific Steamships, of which company he also became a Director.

Mr. W. Giles, Superintendent in Ireland for Thomas Cook & Son Limited, has retired, and has been succeeded by Mr. F. J. Oakes. Mr. Giles joined the service of the firm in 1892 and served in various minor positions before being appointed Relief Clerk for the Birmingham District. In 1904 he was appointed Branch Manager for the Gloucester

Mr. V. L. Dean, V.D.

Resident Manager, Indian Railways Publicity Bureau, New York, 1937-38

Mr. J. Harvey Gardner

Chief Mechanical Engineer, Tanganyika Government Railways, 1936-38

Photo [*Lafayette*

Mr. W. Giles

Superintendent in Ireland, Thos. Cook & Son Ltd., 1922-38

note last week, has been taken by the Railway Board of India in accordance with the Wedgwood Committee's proposal that attention should be concentrated more on publicity in India than tourist advertising abroad. Mr. Dean received his early training on the former London & North Western Railway, and in 1914 was posted to the North-Western Railway, India, as Assistant Traffic Superintendent. He officiated as District Traffic Superintendent in 1918, and was subsequently confirmed in that appointment. For three years Mr. Dean was Principal of the Walton Training School, North-Western Railway, which appointment he relinquished in 1937 to take up that of Resident Manager of the Indian Railways Publicity Bureau in New York.

The late Viscount St. Davids, Chairman of the Buenos Ayres & Pacific Railway and of numerous other British and South American undertakings, left estate of £123,736 (net personalty nil).

We regret to record the death on May 20 of Captain James Gillies, C.B.E., who retired some few years ago from the position of General Manager of the Canadian Pacific Steamships. Captain Gillies joined the Elder Dempster Line as Third Officer of the *Milwaukee* in 1899, and entered the C.P.R. service when the

office, which he opened, and two years later was appointed to the new offices in Cardiff. This development coincided with the opening of the Fishguard—Rosslare route to Ireland, and was an effort to create a flow of traffic from Ireland to South Wales by the Rosslare route. In November, 1922, Mr. Giles was appointed to the position from which he now retires. Mr. F. J. Oakes, who succeeds Mr. Giles, has had a very wide experience with his firm in England, France, and Italy.

The funeral of Mr. B. Carpenter, Dock Manager, Cardiff and Penarth Docks, G.W.R., whose death on May 14 we recorded last week, took place at Cardiff on May 18. Among the representatives of the railway company who attended were:—

Messrs. F. G. Wainwright (Divisional Superintendent, Cardiff), W. J. Thomas (Chief Docks Manager), J. H. Swallow (Deputy Chief Docks Manager), E. V. Swallow (Dock Manager, Barry), H. B. Smith (Dock Manager, Newport), L. E. Ford (Dock Manager, Port Talbot), H. W. Morgan (Dock Manager, Swansea), C. E. Boxall (Goods Manager, Cardiff), J. F. Arthur (Dock Mechanical Engineer, Cardiff, Penarth, and New-

port), M. C. Harrison (Divisional Docks Engineer, Newport, Cardiff, Barry, and Penarth), and V. N. Jolliffe (Divisional Electrical Assistant, Newport, Cardiff, Barry, and Penarth); also numerous representatives from Mr. Carpenter's staff at Cardiff.

Mr. M. D. Robinson was wrongly designated last week in our list of delegates to the Institute of Transport Congress in Edinburgh. Mr. Robinson is District Locomotive Superintendent, Neasden, Southern Area, L.N.E.R.

Mr. Ronald Hibbert Cross, M.P., has been appointed Parliamentary Secretary to the Board of Trade, succeeding Captain Euan Wallace, M.C., M.P.

Mr. H. C. Drayton has been appointed Chairman of the Costa Rica Railway, to succeed the late Viscount St. Davids. The new Viscount St. Davids (formerly the Hon. J. R. A. P. Phillips) and Mr. R. P. W. Adeane have been appointed Directors.

Mr. T. B. Keep, M.I.Mech.E., M.I.A.E., M.Inst.T., Managing Director of Petters Limited, of Yeovil, makers of the well-known oil engines, has recently accepted the additional appointment of Managing Director of the Brush Electrical Engineering Co. Ltd.

Mr. R. A. Thom, O.B.E., Mechanical Engineer (Southern Area), L.N.E.R., will retire at the end of July. Except for the four years 1899-1902, Mr. Thom has been continuously associated with the L.N.E.R. and its constituents since 1888, serving with the former Great North of Scotland; the Lancashire, Derbyshire & East Coast; and the Great Central Railways.

Mr. A. W. Langworthy retires at the end of this month from the position of Divisional Marine Superintendent (Portsmouth), Southern Railway, which he has occupied since 1913. He has been in charge throughout this period of the Southern Railway Portsmouth—Isle of Wight steamers. Mr. Langworthy is succeeded by Mr. C. T. Pelly, General Assistant to the Docks and Marine Manager, Southampton.

We regret to record the death on May 22, at the age of 62, of Mr. George E. Beer, who was for two years (1922-24) Assistant for Publicity Purposes to the General Manager of the Great Western Railway. Mr. Beer was a journalist who held several important newspaper posts in the course of his career, his energy and resourcefulness causing him to be selected by the late Lord Northcliffe as News Editor of *The Times* in 1914. He held similar positions with the London News Agency, and the *Daily Mail*. A keen worker for the Newspaper Press Fund, he was a member and for two years President of its council.

The Institute of Transport Congress at Edinburgh

Further report of proceedings—Paper by Professor Alexander Gray — Discussion on the three papers

Nearly eight years have passed since the Institute of Transport last held a congress in Scotland, and those who remember the notable Glasgow Congress of 1930 under the presidency of Sir Josiah Stamp, will know what a very high standard was then set. While the Edinburgh programme was, in some respects, not so ambitious as the one for Glasgow, it was carried through with precision and enthusiasm, and the Chairman, Honorary Secretary, and members of the Local Committee deserve great credit for their arrangements for the instruction and entertainment of the visitors. The impression was gathered that everyone mixed more freely than at previous gatherings, and, if correct, the reason was no doubt to be found in the kindly and friendly spirit of the Local Committee and local members who made it their business to welcome and be helpful to the delegates and to ensure a happy and informal social atmosphere.

The congress, which was attended by upwards of 400, was presided over by Sir Alexander Gibb, President of the institute, and had its headquarters at the North British Station Hotel of the L.N.E.R. The programme comprised the discussion of three papers, visits of transport and general interest, and three evening social functions.

Mr. Henderson's Paper Discussed

Opening the discussion on the paper by Mr. A. Henderson, on "The Regulation and Control of Transport in Europe" (summarised last week), Mr. Frederick Smith criticised the Road and Rail Transport Act of 1933, the whole basis of which, he said, was supposed to be administrative, but it had been applied in a mistaken spirit of legal formulism. Moreover, the regulation in this country was far more rigorous and restrictive than in any other country, not excepting Germany. He would suggest an appeals tribunal made up of licensing authorities.

Mr. C. E. R. Sherrington did not agree with Mr. Smith as to the severity of regulation in this country. He thought the regulations in Great Britain were a good deal less rigid than those in Germany and Italy.

Mr. G. B. Lissenden suggested that only when transport men realised that they were the dictators of the position and not the Cinderellas of industry, would they obtain justice.

Mr. C. S. Dunbar said that although Northern Ireland was not referred to in the paper, it would furnish a better guide than Czechoslovakia. The question of the "C" licence was a vital one. Only France had thought fit to offer an alternative route or a monetary compensation to the owner of a service which had been shut down. This would have to be faced here.

Mr. George Mills, commenting on the suggestion that transport was the Cinderella of industry, said the tradition of the railways was to assist industry because transport was the handmaiden of industry. The representatives of road transport complained of regulation, but compared with the railways they really did not know what control meant. He was not unduly saddened by the serious effect of the dreadful restrictions, when he saw the increase in the number of licence-holders.

Mr. Archibald Henderson, in reply, referred to the points raised by Mr. Smith and suggested that if there appeared to be more rigidity in the regulations in this country, it might be because we lived up to the law better than in most places. The road transport people referred to themselves as the Cinderellas of industry; and presumably the railway companies and the canals were the two ugly sisters. But after all it was Cinderella who lived happily ever after, leaving her sisters out in the cold. He did not think, however, that there were any Cinderellas; they were all members of the family, pulling their weight in their own way.

Reception by Lord Provost

On the first evening (Wednesday, May 18) of the congress, the members and their ladies were entertained at the famous Assembly Rooms by the Lord Provost (the Rt. Hon. Sir Louis Gumley), magistrates and Council of the City of Edinburgh, who, attired in their robes and attended by City officials in their ancient costumes, received the delegates before dancing began.

Discussion on Mr. Mills's Paper

Mr. W. H. Gaunt, in opening the discussion on Thursday on the paper by Mr. George Mills, "The Price of Transport" (summarised in our issue last week), questioned the definition of "price." The price of transport must be sold again by trader and industry just as much as any other component of the cost of the product. He thought there would be many who would disagree with Mr. Mills' conclusions. Mr. Mills had said that the railways were "entitled" to a modest revenue, but everyone in business could say that.

Dr. Fenelon explained the importance of cost. The classification had been built up on many factors, some statutory and others economic. Unfortunately, the railways did not know, or would not say, what their costs were for handling different kinds of traffic.

Mr. James Paterson thought the classification was gradually being changed and broadened down by the agreed charges of the 1935 Act. The costing system should be studied. The amounts

paid by motor transport for the hire of the roads, as well as the cost of the railway track and its upkeep, should be reduced to accountancy figures.

Mr. Frederick Smith expressed surprise that there had been no reference to non-discrimination or undue preference, which he thought was at the root of the difficulties of the railways. One of the first steps should be to wipe entirely from the statute book the law of undue preference. He regarded the question of classification as unimportant; it was the doctrine of non-discrimination which was important.

Mr. D. R. Lamb advocated the appointment of a small body of experts from each side.

Mr. C. H. Lott referred to the illegal competition by the "B" man and the small foreign coaster boat in Scotland.

Mr. E. W. Willis advocated a major operation, cutting away all the dead capital of the railways. He said the old monopoly had gone and he agreed with Sir Ralph Wedgwood when he said in a recent broadcast that railways had benefited by the competition of road transport.

Mr. C. S. Dunbar said he would object to the railway classification being applied to his business because he did not operate units that would enable him to apply it. He thought the eventual amalgamation of road interests, on the lines of the railway amalgamations, would solve the problem.

Mr. D. Ross-Johnson recalled that the Act of 1921 did revise the capital of the railways and he thought the remarks of previous speakers on this point required qualification. He thought the unfortunate shareholders had come off worse, and a reduction of capital would not help them.

Mr. Lissenden suggested that the subject of transport was too big and important to be left in its present position. A body of scientifically minded men should be appointed to examine and report on it.

Mr. W. A. Willox, endorsing Mr. Lissenden's suggestion, thought any such investigation ought to get down to a basis of reality in costing. The unreliability of the present costing system was illustrated in the paper, where the author said that "Approximately 60 per cent. of the total railway working expenditure is of the nature of fixed or non-variable costs," and a little later on that wages (*i.e.*, variable costs) represented about two thirds of the expenditure. In reality cost was simply that which was consumed in production. If cost were thus calculated in terms of reality the most efficient form of transport would automatically be the cheapest.

Mr. George Mills, in replying, said that Mr. Willox had pointed out that the supply of transport was greater than the demand, and that the monetary system made things difficult; that was precisely what was said at the beginning of the paper, that supply and demand had received a severe jolt. There was no contradiction in the figures quoted by Mr. Willox, because the proportion of two-thirds related to the 40 per cent. remaining after the 60 per cent. of non-variable expenditure had been deducted. The allocation of costs on the railway was a difficult matter. When the railways performed all the transport they could spread their costs, but now a competitor had come along and carefully selected the traffic on which it could make the biggest reduction in rate.

Waverley Station Visited

On Thursday afternoon (May 19), after the discussion of Mr. Mills's paper, there were alternative visits of inspection. One party inspected the power signalling installation and the control offices of the L.N.E.R. at Waverley station. The Coronation train was inspected at the station and its departure witnessed. Other parties visited the central bus garage and Shrubhill works of the Edinburgh Transport Department; the New Street garage and works of the Scottish Motor Traction Co. Ltd.; and Granton Harbour, and Leith Docks.

Thursday evening was a Scottish evening. The local branch held its annual dinner at the North British Station Hotel with a menu comprising such bewildering dishes as Hen Bree; Sheep's Heid Kail; Haddie frae Newhaven wi'a Lemon Toorie; Haggis wi' nips, Bashed Neeps (which were not produced) an' Chapit Tatties; Roastit Heilan Lamb, Biled Tatties, new pu'd peas; Tasty frostit pudden. The haggis was piped in, in traditional style, by a piper of the S.M.T. band. Mr. A. Henderson, Chairman of the section, presided, and Sir Alexander Gibb proposed "The City of Edinburgh," which was responded to by the Lord Provost. Other speakers were Mr. D. Ross-Johnson, who proposed "The Scottish Section" (acknowledged by the Chairman); Sir William Thomson, who proposed the health of the guests; and Professor Alexander Gray who replied for them. The dinner was followed by dancing until 2.0 a.m. and the Local Committee must have been gratified to observe that very few appeared to leave earlier. During the evening (or was it morning?) an exhibition of Highland dancing was given by dancers from the pipe band of the Edinburgh Corporation Transport Department.

"The Conception of Public Utility in Relation to Transport"

Professor Alexander Gray prefaced his paper on May 20 on the above subject, with a review of the history of transport from the early days of the nineteenth century to the present time. Prior to the revolution in transport occasioned by the introduction of the railway, the atmosphere, so graphically described in 1823 by the French traveller, Adolphe Blanqui, was essentially one of *laisser faire*. Complete freedom of competition was believed to give the best service to the consumer, and the users paid according to their use, by a system of tolls, on roads, canals, and bridges. Although railways came in to revolutionise transport there was little change in the general idea of the value of unrestricted competition; indeed the monotonous series of commissions and inquiries seemed rather to aim at compelling railways to compete, whether they wished to or not. Out of that welter of committees Professor Gray singled out the Gladstone Committee and Railway Regulation Act of 1844, in which, without straining things too much, the dawn might be seen of the view that transport is a public utility. Of all the major industries transport was that one which most required foresight and planning, and a unified control over a wide area. Transport can never be merely a question of moving between adjacent towns. Hence the creation of the large main lines and the Clearing House.

The nineteenth century idea that the flame of competition must be carefully fanned finally broke down with the Committee on Railway Agreements of 1911. The report of that Committee proved among other things that all that happened during and immediately after the war was not due merely to the war, and that without the war there might have been something like the Railways Act of 1921. The Act of 1921 meant a complete reversal of policy, a landmark in post-war social and industrial legislation. Professor Gray did not dwell in detail on the provisions of that Act. It was the first intervention of the State on a big scale, the abandonment of the old doctrine that a wise government will be as inactive as possible. Yet even the most non-interventionist government recognised its own unavoidable function of protection, and the extension of this theory of protection to other services, to protect the citizen against himself, as it were, was a familiar story. Perhaps nowadays we looked with somewhat jaded eyes on a government which had, to use the phraseology of M. Blanqui, the mania of directing everything.

Forty years ago, when the intervention of the State was visualised, it took the form of "nationalisation." Today the word was hardly ever heard, at any rate in the old sense. The extension of the sphere of intervention, with at the same time the unwillingness or inability of the State to make itself responsible for the industries it seeks to hedge about, had given rise to a new type of administration, a body with the virtues of private enterprise but with an infusion of the idea of public service. Professor Gray quoted the B.B.C. and the L.P.T.B. as examples. There were two phases, he said, marking the period since 1921, one the relationship between road and rail, and the other, the emergence of that portent, the

L.P.T.B. As regards the road-rail controversy, he said that if scientific progress evolved a method of transport more efficient than the railway, then the railways would have to go. But the danger to the railways was not that they might be displaced by a more efficient form of transport but that in the chaotic distribution of work resulting from lack of regulation on the other side they might be set a task impossible of accomplishment. He avoided the word "competition." Road and railway should represent complementary and not competitive services. The Road Traffic Act of 1930 and the Road and Rail Traffic Act of 1933 represented what was perhaps a transition stage on the path towards fusing rail and road into one homogeneous service. The mission of the Traffic Commission resembled other restrictive organisations in its function of limitation. The function of these controlling bodies is, generally speaking, to keep down the number of units involved, in other words, restriction.

As regards the L.P.T.B., Professor Gray said this very great experiment had as yet only a few years of existence and any conclusions should be somewhat tentative. Meanwhile it might be sufficient to quote Mr. Frank Pick, when he said, "The Minister of Transport has almost faded from the Act and the board is neither responsible to him or to the Railway Rates Tribunal; in the escape from capitalism we have almost fallen into a dictatorship."

As for the future, an extension might be visualised of the system of the London Passenger Transport Board. Indeed there already existed, in the additional recommendations to the final report of the Royal Commission on Transport in 1930, proposals for merging the whole of the transport agencies, terrestrial, maritime and aerial, in one single corporation.

Professor Gray's Paper Discussed

Dr. K. G. Fenelon, opening the discussion on the paper by Professor Alexander Gray, remarked that all the papers presented to the congress had dealt with the question of State intervention. One reason why even private enterprise tended to approximate to a government model was that the autocratic power of the nineteenth century employer had been reduced by the development of organisation among the workers. There was now less difference than formerly between government and private enterprise. In both cases the size of units had increased.

Mr. D. R. Lamb recalled the pre-war efforts of the railways themselves towards unification, discouraged by the then Government. Ultimately, of course, the State went to the other extreme, but included unremunerative undertakings, so that the railways could not be altogether blamed for their present position.

Mr. W. A. Willox said that although some control was necessary in present conditions, it was now tending to crush out our individuality like the tentacles of an octopus. If the nation accepted this increasing control it must be becoming lunatic, for sane people should have reasonable freedom. We were forgetting the elementary principles of association, the only reasonable purpose of which was to benefit the individual with the least possible loss of his freedom. Government should be regarded as the servant of the people, and not as an all-wise parent. If people would realise that and exercise their power as individuals to demand the common objective of individual freedom, it might be possible to escape from the trammels of a suffocating control.

Mr. C. S. Dunbar said there was danger of hopeless chaos if gigantic corporations were set up without any attempt to relate them to one another and to the life of the nation.

Mr. J. H. Hannay-Thompson pointed out that the constitution of many of the port trusts, which were true non-profit-making public utilities, dated back to pre-railway days, so the idea of the L.P.T.B. was not as original as many people thought.

Mr. George Mills thought there was a new mentality which seemed to say "What will the State do for us?", not a very pleasing feature.

Mr. S. E. Garcke differentiated between a commodity and a service. An unsold commodity remained to be sold another day; an unused service was wasted.

Professor Alexander Gray, in reply, said it was not his intention to lay down the law. Dr. Fenelon had made a point of great substance in referring to the approximation to one another of the methods of business and government departments. The discussion had trenched on fundamental questions of democracy and dictatorship. In this country the method adopted was to give everyone a chance of expressing his views before a decision was taken. He had been glad to hear one voice raised for fundamental liberty, though of course an ordered community involved some measure of control. With regard to the future, he looked to developments, perhaps in connection at first with electricity and banking, and always in the sense of larger units. He dissented from the view that it was necessary to decide now where we were going; it was the genius of this country not to make up our minds too soon where we were going. He would not like to visualise a world governed by large bodies of the kind that had been discussed, but inside the large field of free enterprise there would probably be an increasing measure of control.

Delegates Guests of Railways

The L.M.S. and L.N.E. Railways entertained the delegates on the Friday afternoon, when a visit was made to the Gleneagles Hotel of the former company in a special train provided by the L.N.E.R. The route followed was that of the L.N.E.R. to Perth *via* the Forth Bridge, Dunfermline, and Glenfarg. At Perth an L.M.S. Pickersgill 4-6-0 took over from the L.N.E.R. 4-4-0 "Director" class locomotive, and, after passing through some beautiful Perthshire scenery the train was met at Gleneagles by Mr. Norman D. Macdonald, whose skilful tree planting has had so much to do with the beauty of the hotel surroundings. Motorcoaches provided by W. Alexander & Co. Ltd. carried the visitors to the hotel, where they were entertained at tea, and afterwards had the opportunity of seeing the splendid amenities of the hotel and appreciating its magnificent situation, with its golf courses and views of the verdant Ochil Hills and rugged Grampian Mountains. The return to Edinburgh was made *via* Larbert (where another L.N.E.R. "Director" took over the train) and Polmont. The train also passed Bannockburn, the programme stating with parenthetical relish ("the battlefield cannot be seen from the train").

The Friday evening was taken up by a reception by Sir Alexander Gibb, with dancing afterwards until 1.0 a.m. This function was a happy and informal one which gave everyone a pleasant and welcome chance to mingle and make their last exchanges before the close of the congress. That close came the following day when two all-day visits were arranged—one to the British Empire Exhibition at Glasgow in a special train kindly provided by the L.M.S.R.; the other to Dryburgh and the border country in motor-coaches kindly placed at the institute's disposal by the Scottish Motor Traction Co. Ltd., which entertained its guests at lunch at Dryburgh and at tea at Peebles. At Peebles they were given a real Scottish welcome and farewell by the splendid pipe band of the Scottish Motor Traction Co. Ltd., every member of which wears the Thomson Tartan in honour of Sir William Thomson. The formal conclusion of business had taken place after Professor Gray's paper, when, on the motion of the President, votes of thanks were passed to all those who had helped in organising the congress or who had kindly provided the various special facilities and visits. A vote of thanks to the President himself was carried on the motion of Mr. Sidney E. Garcke.

A number of ladies participated in the congress and took a lively interest in the proceedings. The programme made special provision for their pleasure in the shape of visits to the castle and National War Memorial, the Scottish Zoological Park, and a tour of the city.

A list of some of the participants in the congress was published in last week's issue.

(*See also editorial note on page* 1006)

XUM

The Manchester & Bolton Railway Centenary

A railway which developed from a canal undertaking—At first trains ran on the right-hand road—The earliest railway rate war

Sunday next marks the centenary of the opening of the Manchester & Bolton Railway, an undertaking which had many unusual features in its early history, and by courtesy of Mr. O. Glynne Roberts, Secretary of the L.M.S.R., we are enabled to set out some of these in the following historical notes. The Manchester & Bolton Railway had its origin in the Manchester, Bolton & Bury Canal which was promoted in 1790. It was originally projected for the purpose of making a communication, by narrow boats 7 ft. wide, between Manchester, Bolton, and Bury, but by an agreement entered into in 1794 with the Leeds & Liverpool Canal Company for making a junction at Redmoss, the proprietors of the Manchester, Bolton & Bury Canal were induced to make their canal capable of navigating vessels 14 ft. wide, the same as those on the Leeds & Liverpool Canal.

By the first Act, obtained on May 13, 1791 (31 George III, cap. 68), the proprietors were incorporated as "The Company of Proprietors of the Canal Navigation from Manchester to Bolton and to Bury," and were empowered to make a canal from the River Irwell near the Sugar House or Old Quay in Manchester, to a meadow near Presto-lee-Bridge, in the township of Little Lever, and thence by one branch to Church Bridge, Bolton, and by another branch to Bury Bridge and Weddell Brook, and to make reservoirs, steam engines, and other machines for supplying the same with water.

The canal was opened for traffic in 1796, and was used for the conveyance of goods and passengers, but in March, 1838, the "canal packets" were sold as they did not pay and their speed damaged the banks. In 1830 the directors of the undertaking came to the conclusion that canal navigation would have but a brief existence, and they determined, therefore, to convert their waterway into a railway. Application to Parliament resulted in the incorporation on August 23, 1831, of "The Company of Proprietors of the Manchester, Bolton & Bury Canal Navigation & Railway" to take over the canal and construct a railway either on its site or by its side. The directors changed their minds shortly afterwards, and secured a further Act, on June 1, 1832, altering the original scheme in order that the railway might be constructed by the side of the canal throughout its course, except in Salford, where it was to be diverted. Three years later an Act of June 17, 1835, authorised a further alteration, namely, a deviation in the railway from Clifton to Bolton, where the idea of a line alongside the canal was abandoned, and a more direct route was adopted.

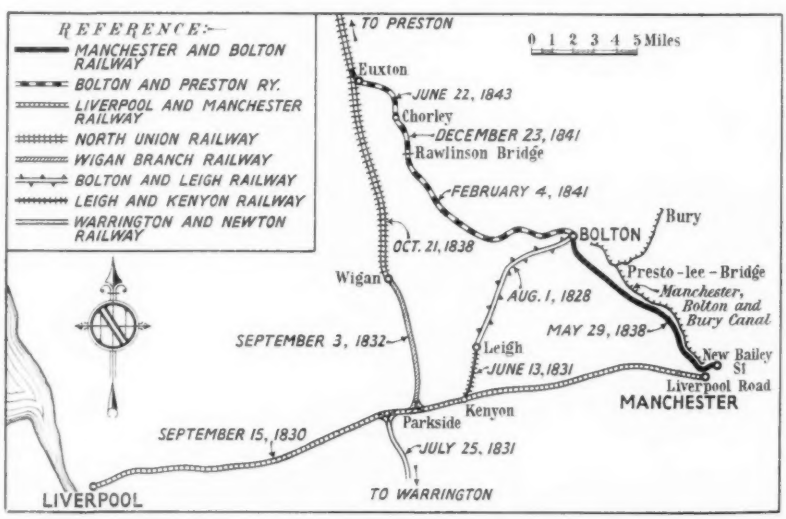
The Manchester & Bolton Railway was opened for traffic on May 29, 1838, from a terminus in New Bailey Street, Salford, to Bolton. The branch line to Bury was not proceeded with. The gauge of the line was 4 ft. 8½ in., and the rails were of the broad-base parallel type weighing 55 lb. a yard, fixed to cast-iron pedestals. Some parts of the line were laid on continuous longitudinal stone sleepers, while the other portions were attached to half balks of timber. Cross sleepers were introduced underneath the longitudinal timbers. For this railway, the original estimate was £300,000, but the actual cost exceeded £600,000 which represented an outlay at the rate of £60,000 a mile. The country through which it passed was very rugged, and the earthworks were consequently heavy.

In June, 1837, the Liverpool & Manchester Railway offered the Manchester & Bolton Railway its old *Arrow* locomotive for £300, but the company declined "taking the *Arrow* at any price." Four engines were supplied by Edward Bury of the Clarence Foundry and were named *Fairfield*, *Victoria*, *Bolton*, and *Manchester*; and two were made by George Forrester & Company, of which the first was named *Forrester* and the second *Buck*. In March, 1838, a tender for four locomotives from William Fairbairn was accepted, and the *Windermere*, *Crosley*, *Woolton*, and *Bootle* were supplied. All matters relating to carriages were left to discretion of Nathaniel Worsdell, the son of the man who built the tender of the *Rocket* on the Liverpool & Manchester Railway.

There were many points of interest in the company's early fare policy. By its Act of incorporation, it was authorised to charge 2½d. a mile for passengers in open wagons, with "such reasonable sum in addition" for conveyance in covered carriages. From May 29 to June 10, 1838, the first class fare was 2s. 6d. for the whole 10 miles (3d. a mile), and the second class fare 2s. (2·4d. a mile). On June 11 fares were reduced, and third class accommodation introduced. The fares were then 2s., 1s. 6d., and 1s., but third class carriages were discontinued on December 1, 1838, and the fares revised as 2s. 6d. first class and 1s. 6d. second class.

The First Rate War

A few years later the Manchester & Bolton Railway was involved in the first railway rate war. The Bolton & Preston Railway had been opened from Bolton to Rawlinson Bridge on February 4, 1841, and for the time was only of local importance, but the opening of the final section of the Bolton & Preston from Chorley to Euxton Junction, on June 22, 1843, provided a second and shorter route for passengers between Manchester and Preston. Hitherto the only route available had been over the Liverpool & Manchester Railway to Parkside (14½ miles) and the North Union Railway thence to Preston, a total distance of 36 miles. But the completion of the Bolton & Preston provided a route 6 miles shorter, using the Manchester & Bolton Railway for 10 miles to the latter town, and the Bolton & Preston thence to Euxton, 14½ miles, whence that company's trains had running powers for the last 5½ miles over the North Union into Preston, for which a toll of 1s. a passenger was levied. The Bolton & Preston Company started by charging the same through fares as had hitherto been fixed by the North Union, namely, 7s. 6d. and 5s. for the first and second class passengers respectively, relying on the shorter distance and journey time to attract the traffic



Sketch map of the early railways between Manchester and Preston, showing dates of opening

to this route. Almost immediately the North Union reduced its fares to 5s. and 3s. 6d. from July 1, and was promptly imitated by its competitors. A further reduction to 3s. and 2s. took place on July 15, again to be copied by the Bolton & Preston and Manchester & Bolton Companies.

In order to prejudice the new route the North Union purposely delayed the trains of the Bolton & Preston Company when running between Preston and Euxton, so the latter established a service of coaches for that 5½ miles into Preston in connection with its trains, and took steps to revive the powers granted the company in its first Act to convert a canal into a railway for this distance. Negotiations then took place between the two boards with a view to arriving at some agreement. The Bolton & Preston first offered the North Union two-fifths of the passenger and half the goods traffic between the competitive points, if the latter would grant free running powers between Euxton and Preston, with accommodation there and at the intermediate stations of Leyland and Farington for a sum of £100 per annum. This proposal being refused the Bolton & Preston suggested three-quarters of the total traffic for itself (but continuing to pay toll), and then three-fifths, but the North Union would agree to nothing less than equal shares.

Finally an alliance of the two companies was arranged on the basis of an amalgamation of the paid-up capital, the North Union shareholders to receive twice the amount of dividend up to 6 per cent., after which any surplus was to be shared. The original fares were reverted to on October 22, 1843, and the amalgamation was arranged to take effect from January 1, 1844. The enlarged North Union Railway subsequently passed into the hands of the L.N.W.R. and the Lancashire & Yorkshire jointly.

The Manchester & Bolton itself was vested in the Manchester & Leeds Railway by Act of August 18, 1846 (effective from January, 1845). The Manchester & Leeds became the Lancashire & Yorkshire Railway in 1847, and is now, of course, part of the L.M.S.R.

STAFF AND LABOUR MATTERS

Railway Wages

The three railway trade unions—the National Union of Railwaymen, the Associated Society of Locomotive Engineers & Firemen, and the Railway Clerks' Association—have sent to the railway companies their claims for increases of wages and improvements in conditions of service. We reported last week that the unions were unable to agree upon a common claim and there are wide differences between the demands that are put forward.

N.U.R. Claims

The claims of the National Union of Railwaymen are:—

1. That the minimum rate of wages payable to any adult conciliation grade employee shall be not less than 50s.

2. That the arrangements for spread-over working provided for in the National Wages Board Decision No. 2, dated January 24, 1922, and National Wages Board Decision No. 119, dated March 5, 1931, be terminated.

3. That two weeks' holiday—twelve weekdays—with pay be given to all employees embraced in the conciliation scheme grades.

4. That the arrangement for extended rosters provided for in National Wages Board Decisions Nos. 2, 12, and 14, be terminated.

5. That all staff in salaried and conciliation grades shall be paid a minimum of four hours' pay at Sunday rates for each time of signing on duty on Sundays. (This proposes to amend the conditions set out in National Wages Board Decision No. 12.)

6. That when staff in conciliation grades are rostered for five long and one short turns of duty in accordance with the provisions of circular-letter, No. 1,786, of April 3, 1919, the short turn shall be worked on Saturday morning.

A.S.L.E. & F. Claims

The claims of the Associated Society of Locomotive Engineers & Firemen, which are limited to engine drivers, motormen, firemen, and engine cleaners, are:—

Rates of Pay, drivers and motormen—First, second, and third years, 13s. a day; fourth and fifth years, 14s. a day; sixth year, 15s. a day; seventh year and onwards, 16s. a day.

Firemen—First, second, and third years, 10s. 6d. a day; fourth and fifth years, 11s. a day; six to eight years, 11s. 6d.; ninth year and onwards, 12s. a day.

Firemen not appointed after completing 313 driving turns to be paid the driver's minimum rate when firing, irrespective of years of service as fireman.

Cleaners—Aged 16 years and under, 4s. per day; 17 years, 5s. a day; 18 years, 6s. a day; 19 years, 7s. a day; 20 and 21 years, 8s. 4d. a day; 22 years and over 9s. a day.

Cleaners not appointed after completing 313 firing turns to be paid the fireman's minimum rate when cleaning, and receive a fireman's uniform.

Holidays—After twelve months' service two weeks' holiday (twelve weekdays) with full pay to be given annually.

Sunday duty—All time worked between midnight Saturday and midnight Sunday to be paid for at the rate of time-and-a-half, with a minimum payment of 8 hr. for every time of signing on duty. Turns commencing on Sunday extending into Monday to be treated as Sunday turns and to be paid at the above rate throughout and exclusive of the guaranteed week.

Hours of duty—Cancellation of the provision for an extension of rosters, where economy will accrue, up to nine hours a day.

R.C.A. Claims

The claims of the Railway Clerks' Association are:—

Male clerical staff in Class 5—a scale commencing at £160 at age 25 rising by annual increments of £10 to £220 at age 31.

Women clerks in Class 2—aged 30 years, 62s. 6d.; 31 years, 67s. 6d. Women clerks in Class 1—a scale of 72s. 6d., 75s., and 77s. 6d.

£20 to be added to each amount in each class above Class 5 for men and Class 1 for women. Stationmasters in Class 6 to receive £160 in the first year and £170 in the second year. Stationmasters and supervisors in Class 5 to receive £180 in the first year, £190 in the second year, £200 in the third year and £220 in the fourth year. £20 to be added to each amount in each class above Class 5 for stationmasters and supervisors.

Railway Clearing House numbertaking staff—Class B, a scale commencing at £135 4s. at age 25 rising to £156 at age 30. Class A, a scale commencing at £161 4s. at age 31 rising to £176 at age 35. £20 to be added to the salaries of the working foremen and supervisors.

London Allowance — the proposed salaries to be increased by £10 to all staff who work at depots and stations within a radius of 15 miles of Charing Cross.

Night duty—In the case of those not in receipt of the aggregation allowance, all time worked between 10.0 p.m. and 4.0 a.m. shall be paid for at the rate of time-and-a-quarter, it being understood that the night off in ten for continuous night duty should continue, but that the night off in fifteen for intermittent night duty should be discontinued.

Unappointed staff—All persons who have been employed in this capacity for two years shall be appointed to the salaried staff and be accorded all the conditions attaching thereto.

Hours of duty—a forty-hour week, to be covered by turns of duty none of which shall exceed, from start to finish (including meal-times), nine hours, except by local arrangement which would require to be endorsed by a central authority—say a sectional council, &c.

Annual holidays—All annual holidays shall be given between the months of May and September (inclusive) if so desired by the staff concerned, the following to be the periods: under 20 years' service, 12 weekdays; 20 years' service and over, 15 weekdays; 30 years' service and over, 18 weekdays.

Procedure

There is no question of any immediate crisis arising as a result of the demands made by the three railway trade unions. The claims will be dealt with through the very comprehensive Scheme of Machinery of Negotiation for Railway Staff, culminating in the Railway Staff National Tribunal.

Railway Shopmen

After a meeting held in London on Monday, May 23, of the trade unions representing the employees' side of the National Railway Shopmen's Council, the undermentioned programme of claims for increases in rates of pay and improvements in conditions of service of staff employed

under workshop conditions has been submitted to the railway companies:—

(*i*) *Consolidation of Wages.*—That the base rates and war wage be consolidated.

(*ii*) *Rates of Pay.*—That the rates of pay shall be increased by 2d. an hour, and that in no case shall the base rate be less than 50s. a week.

(*iii*) *Hours of Duty.*—That 40 hours shall constitute a standard week's work, without any reduction in pay.

(*iv*) *Guaranteed Day and Guaranteed Week.*—That each employee be guaranteed a day's pay for each day he is available for duty, and that each employee be guaranteed a standard week's pay.

(*v*) *Holidays with Pay.*—That each employee be allowed twelve working days' holiday with pay per annum.

It is understood that the claims will be considered by the National Railway Shopmen's Council, which consist of representatives of the railway companies and of the trade unions.

Questions in Parliament

Railway Ban on Air Bookings

Mr. W. R. D. Perkins (Stroud—C.) on May 12 asked the Under Secretary of State for Air whether he would direct a public inquiry, under Section 10 of the several Railway (Air Transport) Acts of 1929, as to the booking ban imposed by the railways in respect of certain air transport companies.

Lieut.-Colonel A. J. Muirhead (Under Secretary of State for Air): No, Sir. My noble friend has made provision for dealing with this matter in the draft Order in Council which has been laid before the House for the setting up of a licensing authority for air transport.

Facilities for Holiday Traffic

Mr. W. W. Astor (Fulham, E.—U.) on May 18 asked the Minister of Transport what standard he would adopt in deciding if the railways were providing adequate facilities for holiday traffic; and if the restrictions on duplication of motorcoach services would be reconsidered, to enable road transport to relieve railway services at these times.

Dr. Leslie Burgin (Minister of Transport): In considering any appeal which reaches me under Section 81 of the Road Traffic Act, 1930, it has been and will continue to be my duty to give careful consideration to all the facts and evidence and to decide each case on its merits.

Railway Finance Corporation

Mr. R. De La Bere (Evesham—C.) on May 18 asked the President of the Board of Trade whether his attention had been drawn to the fact that the Railway Finance Corporation formed in December, 1935, had never issued any public profit-and-loss statement or statement as to how certain moneys had been expended; and whether, since this company had obtained a guarantee from the Treasury for £26,500,000 both as to principal and interest, he would take steps to ensure this being done.

Mr. Ronald Cross (Parliamentary Secretary to the Board of Trade): The company to which my hon. friend refers has issued its accounts up to December 31, 1937, a copy of which has been filed with the Registrar of Companies at Bush House, W.C.2, and can be inspected by any member of the public on payment of a fee of one shilling. The company was set up merely for the purpose of raising and lending to the railway companies money guaranteed by the Treasury and receiving and distributing money received from the railway companies in payment of their obligations. As stated in the report of the directors which is filed with the accounts, no profit or loss arises from the company's operations and for this reason the directors lay no profit and loss account before the shareholders.

Electrification Precautions

Brigadier-General Clifton Brown (Newbury—C.) on May 19 asked the Minister of Transport how many casualties had occurred on the Southern Railway owing to the electrification of the live rail since the beginning of this year; and how many miles of the new protective fencing, which the company promised him to put up, had been completed.

Dr. Leslie Burgin (Minister of Transport): No one has been killed by contact with the live rail on the Southern Railway Company's lines since the beginning of the year and the only member of the public injured in this way was a child who gained access to the line from a level crossing. I am informed by the company that at the end of April 12 miles of the new diamond mesh had been erected and a further 37 miles were in hand.

Construction of Railway Coaches

Mr. J. R. Remer (Macclesfield—U.) on May 23 asked the Minister of Transport if, in view of the fact that most experts were of the opinion that railway coaches of wooden character were safer, and that if the coaches on the District Railway had been wooden coaches instead of all-steel coaches the casualties would have been negligible, he would set up a departmental committee to enquire into this and other problems in connection with safety on railways.

Captain Austin Hudson (Parliamentary Secretary to the Ministry of Transport): My right hon. friend is not in a position to draw any deductions from the recent accident on the District Railway until he has received the Inspecting Officer's report.

Mr. Remer: In view of the importance of this matter, will the Minister take notice of some of the evidence which was given at the inquiry on Friday into the Charing Cross railway accident, which decisively states that wooden coaches are safer than steel?

No answer was returned.

Chinese Railways

Captain W. T. Shaw (Forfar—U.) on May 23 asked the Prime Minister if the Government had made, or would make, representations to the Japanese Government with a view to securing payment of the interest due on the five per cent. bonds of the Chinese Imperial Railways, Shanghai-Nanking line, as the railway upon which these bonds were secured was at present in the possession of the Japanese.

Mr. A. C. Moreing (Preston—U.) also asked the Prime Minister whether his attention had been drawn to the failure by the Shanghai-Nanking Railway Company to pay the interest due to the British bondholders on June 1; whether this was due to the continued occupation of the railway by the Japanese army, who were still refusing to permit the British engineers of the Shanghai-Nanking Railway Company to inspect the line and were still collecting fares along the railway; and whether he would protest in the strongest terms to the Japanese Government against this injury to British rights in direct violation of the Japanese Government's repeated and spontaneous promises that British interests in China would be respected.

Mr. R. A. Butler (Under Secretary of State for Foreign Affairs): The strongest representations have been made to the Japanese Government in Tokyo and to the Japanese authorities in Shanghai regarding the losses that will be suffered by British bondholders as a result of the Japanese military occupation of the Shanghai-Nanking and other railways and the Japanese Government have been asked to make the necessary financial arrangements for the continued service of the railway loans. Repeated requests have also been made that the British engineers should be allowed to inspect the line of the Shanghai-Nanking railway. I regret that we have not yet received a satisfactory answer from the Japanese Government to our requests.

Skilled Railway Engineers

Mr. P. J. Noel-Baker (Derby—Lab.) on May 24 asked the Minister for the Co-ordination of Defence whether he proposed to take steps to utilise in work for national defence the numerous skilled engineers now being dismissed from the L.M.S.R. carriage works at Derby.

Sir T. Inskip (Minister for the Co-ordination of Defence): The question of making use of the capacity in the railway workshops has recently been fully discussed with representatives of the railways and is being further explored. In the meantime I may say that I understand a number of men were discharged in April from the Chief Mechanical Engineer's Department of the L.M.S.R., but only twenty of these are now on the register at the Derby Employment Exchange and all these are under submission for vacancies.

(*See also at end of opposite page*)

The Charing Cross, District Line, Collision

Inspecting Officer's inquiry continued in private

Lt.-Colonel E. Woodhouse opened his inquiry on behalf of the Ministry of Transport into the causes of the collision which occurred on May 17 on the District Railway, at the offices of the London Passenger Transport Board on Friday, May 20. He expressed the sympathy of the Ministry with those who were injured and the relatives of those who were killed, and pointed out that his inquiry was in no way a court to determine legal responsibility. All knew the remarkable freedom from accident of the London underground railways; he believed it was over 30 years since a passenger had been killed in a train accident.

Mr. R. McDonald, Chief Solicitor (Common Law), L.P.T.B., supported these expressions of sympathy and accepted, on behalf of the board, full responsibility for all proper claims arising out of the accident.

Mr. J. P. Thomas, General Manager (Railways), L P.T.B., outlined the principles of the signal system in use and said that the eastbound starting signal at Charing Cross failed to give the security it ought to have done on the morning of the accident, thus allowing an Inner Circle train to enter a section still occupied by one going to Barking. The board had made the closest investigation into this failure and had ascertained that it was due to a wrong connection which had been made in the course of alterations to the installation which were being carried out the previous night. The check test required and provided in connection with such work also failed. The faults were not in the system of signalling, but in the way in which the signal was dealt with in the course of maintenance. The board was taking steps to tighten up the procedure so as to prevent as far as humanly possible a repetition of such faults.

Immediately after the collision trains were stopped on the westbound road as a precaution. Current was allowed to remain on the eastbound road in order to draw trains forward to the disabled trains, to provide light, and to permit passengers to walk through the trains to Charing Cross; also to enable the cars at the east end of the train to proceed into Temple station. Unfortunately, however, a steel panel fell on to the negative current rail which set up temporary arcing. Current was immediately removed from the eastbound line by the tunnel wires provided for the purpose. This made it necessary to vary the arrangements for detraining passengers and caused them to be detained longer than would otherwise have been necessary.

All the passengers in the two trains were clear by 11 a.m. except those in the last two cars of the stationary train, a few of whom could not be released until 12.30 owing to the badly damaged state of those cars and the necessity to cut away the sheet steel casing.

It had been stated that an explosion occurred, but that was the arcing to which reference had already been made. There was, in fact, no explosion, and no fire. No delay occurred in calling the necessary assistance. The heavy overhaul gang of the board, and its equipment, stationed at Wood Lane, reached the scene of the accident at 10.30. The L.C.C. ambulances and fire brigade responded immediately, and the first patient was actually in Charing Cross Hospital at 10.30.

Mr. Thomas tendered sincere thanks to the doctors and staffs of the hospitals, the police, ambulances, and fire brigade for the immediate response and very great assistance rendered, and, finally, to the passengers who also rendered great assistance and displayed coolness and restraint. Evidence would show that the staff acted with discretion in allowing the current to remain on the eastbound line, because it provided normal lighting of the train for 20 min. after the collision. When the steel plate fell across the track, in order to avoid any serious consequence from arcing a member of the staff applied the device for cutting off the current instantly.

Eleven carriages were involved in the collision, six District and five Metropolitan, and with the exception of the two cars immediately involved only one window was broken and only one door jammed. On the two cars concerned a number of windows had to be broken, some already splintered as the result of the collision, and passengers had themselves removed panes of glass and made their exit by the ladder provided. There was no general breaking of windows.

The Inner Circle train was lightly loaded; the Barking train had about 500 people; about 200 would be standing; it was nearly at the height of the peak. From 9.35 to the time of the accident (9.56 a.m.) 14 trains were run.

For emergency lighting, there were the guard's oil lamp and the driver's oil lamp on all trains, and at District Railway stations batteries of hurricane lamps, which could be taken into the tunnels when required. There had never been an occasion so far as he could recollect when the need for their general emergency lighting had been so marked as on this; the board was taking steps to consider what additional means of lighting should be provided.

Mr. W. S. Graff-Baker, Chief Mechanical Engineer, L.P.T.B., estimated the speed of the Inner Circle train before the collision at 20 m.p.h. or more; emergency braking distance at 20 m.p.h. was about 133 ft. This train was composed entirely of cars with steel underframes and steel-panelled wood bodies. The rear vehicle of the District train was all-steel. The second one was telescoped about 15 ft. and the leading end of the rear car had its end stove in. The colliding train stood the shock pretty well.

Evidence was given by Chief Signal Inspector F. Baker, and some linemen concerning work being done during the night previous to the accident. It was the practice thoroughly to test any altered or disconnected work.

The motorman of the colliding train, A. G. McLean, said the eastbound starting signal at Charing Cross was certainly showing green when he left there; he would have reached about 25 m.p.h. when he saw "something like a hazy red" ahead, on realising it was a train he made an emergency brake application and could do nothing more. He saw no tail light but would not say one was not burning. He was looking for the next signal all the way from Charing Cross.

Guard H. Parks confirmed the indication of the signal there. The oil tail lamps did give some trouble; station staffs sometimes reported them as out. It was part of his work to look after the tail lamp on his train but not to clean it.

Lt.-Colonel Woodhouse intimated that he would conduct a test for visibility under actual conditions with a train standing where the Barking train was waiting on May 17, and that the rest of the inquiry would be private. The test was carried out on Sunday.

Underground Railways Signalling

In the House of Commons, on May 25, Mr. W. Gallacher (Fife, W.—Com.), asked the Minister of Transport if alterations had recently been made in the signalling system in operation on the underground railways of the London Passenger Transport Board with a view to running more trains an hour, particularly on the Charing Cross-Temple section; and whether careful inquiries would be made to see that no speeding up of the system entailed an increase in danger to passengers.

Mr. Leslie Burgin (Minister of Transport): I am informed by the London Passenger Transport Board that no alterations have recently been made to the signalling equipment on the Charing Cross-Temple section of the District Railway with the object of increasing the train service. The only alteration which is being made to the signalling system on this section is the conversion from direct to alternating current. On certain other sections of the board's railways alterations are being made to the signalling system to enable additional trains to be run, but I am satisfied that these alterations will in no way affect the safety of passengers.

Mr. Gallacher: Will the Minister give special and particular attention to this question of signalling and speeding-up in the Underground railway?

Dr. Burgin: Yes, Sir.

XUM

NOTES AND NEWS

Sheffield Victoria Station Modernisation.—A contract for important work in connection with the extensive modernisation and improvement to be carried out at Sheffield Victoria station, L.N.E.R., has just been placed and work is to begin at once. Details of the scheme are given on our Contracts and Tenders page in this issue.

Munich Underground Railway Scheme.—On May 22, Herr Hitler gave the signal for the beginning of the construction of the first underground railway in Munich. In a brief speech the Führer dwelt on his ambitious building scheme for Munich, and explained that, in order to preserve the traditional architectural character of the town, it was necessary to divert part of the traffic underground.

Address Changes.—The London office of Klaxon Limited at 36, Blandford Street, W.1, will be removed on June 1 next, to 201, Holland Park Avenue, W.11. The telephone number will then be Park 6661. Callender's Cable & Construction Co. Ltd. will open on June 1 next, a new sales office and stores at 131, Rose Street, Edinburgh, 2. The address of this firm's contracts office—18, Grosvenor Street, Edinburgh, 12—will remain unchanged.

Lotschberg Railway Anniversary.—The twenty-fifth anniversary of the opening of the Lötschberg Railway was celebrated on May 12, when various journalists were the guests of the board of directors in a special train which took them from Berne to Spiez, Kandersteg, and Brig, and back. The railway was built by a French company at a cost of £4,000,000. Its highest point, 4,080 ft., lies in the middle of the Lötschberg tunnel, which is 9 miles 130 yards long.

Head-on Collision in China.—According to a recent Reuters message from Hongkong, 200 persons were killed and injured in a head-on collision on the Canton-Hankow Railway on the night of May 17. The accident is stated to have occurred at Milokang, 45 miles north of Changsha, when a south-bound passenger train from Wuchang collided with a north-bound freight train from Canton. The cause of the collision is not known, but certain railway officials are reported to have been taken into custody.

Colour-Light Signalling in Belsize Tunnels, L.M.S.R.—In order to deal with traffic more expeditiously on its busy section approaching St. Pancras, and to improve the visibility of the signals, the L.M.S.R. has decided to instal colour-light signalling on both lines in the old (goods) Belsize tunnel and the down line in the new (passenger) tunnel, north of Carlton Road junction, Kentish Town, at a cost of £6,500. Haverstock Hill signal box will be closed. The up passenger line already has colour-light signals, as described in THE RAILWAY GAZETTE for February 5, 1937.

L.M.S.R. Goods Trains in Collision.—A collision occurred near Trent Valley Junction, L.M.S.R., on May 17, when a freight train from Burton to Stafford was run into in rear by another freight train from Birmingham to Stafford. The guard of the Burton-Stafford train was fatally injured, and the engine and about 20 wagons of the other train derailed.

G.W.R. versus L.M.S.R. at Golf.—The recently formed G.W.R. (London) Golfing Society entertained the L.M.S.R. (London) Golfing Society at the Maidenhead golf club on May 20. Six four-ball matches over 18 holes were played, resulting in three wins each. Mr. W. A. Stanier, for the L.M.S.R., and Mr. A. Quartermaine, for the G.W.R., spoke at the supper which followed.

Argentine Government Urges Purchase of British Railways.—A Reuters message from Buenos Aires, dated May 19, states that the Argentine Government has sent a message to Congress urging prompt approval of the purchase of the British-owned Cordoba Central and Transandine Railways. These purchases would be in accordance with the declared policy of the Government, by which the State would gradually acquire all privately-owned railways.

Railway Benevolent Institution.—The eightieth annual meeting of the members of this institution will be held in the Shareholders' Meeting Room, Great Western Railway, Paddington station, on June 28, at 4 p.m., to receive the report of the board of management, grant permanent annuities to 57 widows, four members, and admit to school benefits one child in the Officers' Department, also to grant permanent annuities to 39 widows and 43 members in the Servants' Department. The board will appoint to Contingent Annuities 1,012 widows and 412 members in the Servants' Department, being applicants in excess of the number of permanent annuities to be granted.

A.R.P. on the L.N.E.R.—Two mobile instructional units for training the staff in A.R.P. matters are under construction by the L.N.E.R. Training the staff in this subject has been actively in progress for many months now and classes at a number of centres on the system at which lecture rooms have been improvised have become a matter of routine. Large numbers of the company's staff have already taken the various courses and have qualified. The mobile units will be useful for training the staff on branch lines remote from the main training centres and will also be valuable for demonstration purposes. Each unit will comprise a lecture and dressing room, a washing room fitted with shower baths, an undressing room, and proper storage accommodation for respirators, protective clothing, and appliances. One of the vehicles will be used in the home counties and Midlands, and another will be allocated to the North-Eastern Counties and Scotland.

Institution of Railway Signal Engineers.—At a meeting in London on May 25 a paper on "Gravitation Yards" was read by Mr. J. C. Kubale, Member. In the discussion the following spoke: Messrs. A. A. Syer, P. Lomas, R. Pickerell, A. W. Woodbridge, and the President, Mr. G. H. Crook. A film showing the working at Whitemoor yard, L.N.E.R., was shown by permission of Col. H. H. Mauldin, Superintendent, Southern Area. The summer meeting is to be held at Bristol on June 16, 17, 18, beginning with a visit to the Chippenham works of the Westinghouse Brake & Signal Co. Ltd. At Bristol all-electric signalling installations and telephone exchanges will be inspected and tours made to Bath, Cheddar, and Wells.

Revised 131-lb. Rail in U.S.A.—At the 39th annual convention of the A.R.E.A., held at Chicago in March, the Committee on Rail reported that, as the result of a questionnaire sent out to the railways using the R.E. 131-lb. rail, it transpired that measurements of the top radius when new varied from 18 in. to 24 in., whereas measurements made after the rail had been in use for an appreciable period showed the top radius to be from 11 in. to 14 in. The committee, therefore, recommended the substitution of a 14-in. radius for the 24-in. radius in the centre portion of the top of the rail head, and a $\frac{3}{8}$-in. top corner radius for the present $\frac{1}{4}$-in. radius. This recommendation was adopted by the association. The R.E. 131-lb. rail was illustrated by a cross-section in THE RAILWAY GAZETTE of April 14, 1933.

Tanganyika Concessions Limited.—In the Chancery Division, on May 23, Mr. Justice Crossman, on the petition of Tanganyika Concessions Limited, confirmed a reduction of the capital of the company from £10,000,000 divided into 26,394 10 per cent. cumulative preference shares of £1 each, 3,340,870 6 per cent. B preference shares of £1 each, 6,279,356 ordinary shares of £1 each, and 353,380 unissued shares of £1 each, to £5,445,461 divided into 26,394 10 per cent. cumulative preference shares of £1 each, 2,279,389 6 per cent. B preference shares of £1 each, and 6,279,356 ordinary shares of £1 each. In order to raise funds under the Trades Facilities Acts to complete the Benguela Railway, the Tanganyika Company had to guarantee the debentures of the African Railway Finance Co. Ltd., and the Tanganyika Company has been called upon each year to make payments under the guarantee. These have swelled the debit balance, which is now to be eliminated, and any further payments for redemption of the debentures of the African Company will be a capital charge. The shares and deben-

tures in the Benguela Railway Company will be written down to about £2,250,000. As a result of the reorganisation scheme as a whole, which the Court has now sanctioned, the Tanganyika directors expect that, with the aid of the dividend on the Union Miniere shares for 1937, it will be possible to pay a dividend for the seven months ending July 31, 1938, on the preference shares. The company's accounts are now to be made up to July 31 in each year in lieu of December 31. It is expected that the improved position of the Benguela Railway will be continued.

Competition from London to Bristol.—The Railway Club held its monthly meeting on May 5, when Canon Reginald B. Fellows read an informative paper entitled "London to Bristol—A Great Western Railway Monopoly." The paper, which was illustrated by diagrams, dealt with competitive schemes to Bristol from London. The first scheme was in 1862, followed by others in 1883 and 1903, and all would have branched from the London & South Western Railway at various points. The 1903 scheme was the most dangerous rival to the Great Western Railway, but it failed before Parliament, as did all the others. The paper contained a great wealth of detail, and the author quoted freely from Parliamentary Reports.

L.N.E.R. Week-End Cruises.—The L.N.E.R. has arranged twelve week-end cruises to the Continent during the summer. The steamship *Vienna*, which has been specially adapted for cruising, will leave Harwich (Parkeston Quay) at 11.0 p.m. every Friday from June 24 to September 9, for various Continental ports including Amsterdam, Antwerp, Zeebrugge, Rotterdam, Rouen, and Le Havre. A connecting train will leave Liverpool Street station at 8.15 p.m. and the inclusive fare from London for every cruise will be £3 16s. 6d. This fare includes all meals on board from early morning tea on Saturday to early morning tea on Monday. The August Bank Holiday cruise will last an extra day and the fare will be £5 5s. 0d.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 20th Week			Totals to Date		
	1938	1937	Inc. or Dec.	1938	1937	Inc. or Dec.
L.M.S.R. (6,852½ mls.)	£	£	£	£	£	£
Passenger-train traffic...	451,000	577,000	– 126,000	8,575,000	8,793,000	– 218,000
Merchandise, &c. ...	470,000	437,000	+ 33,000	9,572,000	9,721,000	– 149,000
Coal and coke ...	232,000	215,000	+ 17,000	5,476,000	5,495,000	– 19,000
Goods-train traffic ...	702,000	652,000	+ 50,000	15,048,000	15,216,000	– 168,000
Total receipts	1,153,000	1,229,000	– 76,000	23,623,000	24,009,000	– 386,000
L.N.E.R. (6,315 mls.)						
Passenger-train traffic...	288,000	370,000	– 82,000	5,595,000	5,772,000	– 177,000
Merchandise, &c. ...	317,000	311,000	+ 6,000	6,669,000	6,714,000	– 45,000
Coal and coke ...	221,000	216,000	+ 5,000	5,152,000	5,116,000	+ 36,000
Goods-train traffic ...	538,000	527,000	+ 11,000	11,821,000	11,830,000	– 9,000
Total receipts	826,000	897,000	– 71,000	17,416,000	17,602,000	– 186,000
G.W.R. (3,737 mls.)						
Passenger-train traffic...	187,000	234,000	– 47,000	3,592,000	3,682,000	– 90,000
Merchandise, &c. ...	189,000	173,000	+ 16,000	3,864,000	3,879,000	– 15,000
Coal and coke ...	101,000	74,000	+ 27,000	2,319,000	2,273,000	+ 46,000
Goods-train traffic ...	290,000	247,000	+ 43,000	6,183,000	6,152,000	+ 31,000
Total receipts	477,000	481,000	– 4,000	9,775,000	9,834,000	– 59,000
S.R. (2,147 mls.)						
Passenger-train traffic...	289,000	376,000	– 87,000	5,574,000	5,662,000	– 88,000
Merchandise, &c. ...	62,500	57,500	+ 5,000	1,202,500	1,206,500	– 4,000
Coal and coke ...	26,500	24,500	+ 2,000	653,500	657,500	– 4,000
Goods-train traffic ...	89,000	82,000	+ 7,000	1,856,000	1,864,000	– 8,000
Total receipts	378,000	458,000	– 80,000	7,430,000	7,526,000	– 96,000
Liverpool Overhead ... (6½ mls.)	1,308	1,390	– 82	26,646	23,942	+ 2,704
Mersey (4½ mls.) ...	4,193	4,445	– 252	87,889	84,787	+ 3,102
*London Passenger Transport Board ...	573,700	453,600	+ 120,100	26,454,600	25,965,500	+ 489,100
IRELAND						
Belfast & C.D. pass. (80 mls.)	1,889	2,714	– 825	36,820	38,380	– 1,560
,, ,, goods	360	555	– 195	8,797	9,956	– 1,159
,, ,, total	2,249	3,269	– 1,020	45,617	48,336	– 2,719
Great Northern pass. (543 mls.)	7,950	10,750	– 2,800	172,700	171,650	+ 1,050
,, ,, goods	9,350	9,700	– 350	174,200	190,900	– 16,700
,, ,, total	17,300	20,450	– 3,150	346,900	362,550	– 15,650
Great Southern pass. (2,076 mls.)	27,943	37,316	– 9,373	594,571	588,692	+ 5,879
,, ,, goods	36,451	34,592	+ 1,859	793,130	844,307	– 51,177
,, ,, total	64,394	71,908	– 7,514	1,387,701	1,432,999	– 45,298

* 47th week (before pooling). Bus Strike, 1937. Whitsun Monday, 1937

British and Irish Railway Stocks and Shares

Stocks	Highest 1937	Lowest 1937	Prices May 25, 1938	Prices Rise, Fall
G.W.R.				
Cons. Ord. ...	67⅝	55¾	51	–1
5% Con. Prefce. ...	127	108	114½	–1
5% Red.Pref.(1950)	113	109	109½	—
4% Deb.	113⅝	102½	108	–1
4½% Deb.... ...	118	106	111½	—
4½% Deb.	124½	112	117½	—
5% Deb.	136½	122¾	129½	—
2½% Deb.... ...	76	64	68½	+1
5% Rt. Charge ...	133 7/16	118	127½	—
5% Cons. Guar. ...	133¾	116½	126½	–1
L.M.S.R.				
Ord.	36⅛	25⅜	17¾	–¾
4% Prefce. (1923)	82½	65¾	50½	–½
4% Prefce. ...	92½	77¾	67½	—
5% Red.Pref.(1955)	107¾	102	99½	–1
4% Deb.	108	99¼	101	–1
5% Red.Deb.(1952)	117½	111	111½	—
4% Guar. ...	104	95⅞	98	–½
L.N.E.R.				
5% Pref. Ord. ...	12½	6¾	5	—
Def. Ord.	6¼	3⅝	3	—
4% First Prefce.	79½	63	50	–½
4% Second Prefce.	31½	21	17	–½
5% Red.Pref.(1955)	101¼	89¾	86½	–1
4% First Guar. ...	103	91⅞	93½	–1
4% Second Guar.	97⅝	85½	84	–1½
3% Deb.	84⅛	74	75	–½
4% Deb.	107¼	98½	100½	–½
5% Red.Deb.(1947)	113½	106½	109½	—
4½% Sinking Fund Red. Deb.	110 5/16	105½	108	—
SOUTHERN				
Pref. Ord.... ...	98⅝	83½	74½	–½
Def. Ord.	27⅞	16¾	19	–½
5% Pref.	126 1/16	105 13/16	111½	–1
5% Red.Pref.(1964)	118	110¼	113½	—
5% Guar. Prefce.	133¾	116¾	126½	—
5% Red.Guar.Pref. (1957)	118½	111½	115	—
4% Deb.	112	101¼	106½	–½
5% Deb.	135¾	123½	127½	—
4% Red. Deb. 1962–67	113	105	108½	—
BELFAST & C.D.				
Ord.	5	4	4½	—
FORTH BRIDGE				
4% Deb.	106	99½	100½	—
4% Guar. ...	105¾	99	101½	—
G. NORTHERN (IRELAND)				
Ord.	11	5	5½	—
G. SOUTHERN (IRELAND)				
Ord.	50	21½	20	—
Prefce.	61	34	29	—
Guar.	94¾	69½	59	—
Deb.	95	82⅛	78¼	–1¼
L.P.T.B.				
4½% "A" ...	123¾	110½	116*	–2½
5% "A" ...	135	121½	125½*	–2
4½% "T.F.A." ...	108¾	104	106½	—
5% "B" ...	125	114½	117½*	–2
"C"	99¾	75	76	–1
MERSEY				
Ord.	42⅜	22	19	—
4% Perp. Deb. ...	103	96¾	100	—
3% Perp. Deb. ...	77⅝	74½	74½	—
3% Perp. Prefce.	68¾	61¼	64	—

* ex-dividend

CONTRACTS AND TENDERS

Beyer, Peacock & Co. Ltd. has received an order from the South African Government Railways for the supply of eight class NG/G16 narrow gauge steam locomotives.

Wagons and Coaches for Africa

Hurst Nelson & Co. Ltd. has received an order from the Crown Agents for the Colonies for 18 bogie water tank wagons for the Kenya & Uganda Railways.

Baume & Marpent has received an order for the Egyptian State Railways Administration for four first-class all-steel bogie coaches similar to those to be built by the Metropolitan-Cammell Carriage and Wagon Co. Ltd., for this administration, as recorded in our issue of last week.

The London Passenger Transport Board has signed contracts, valued at approximately £750,000, for the supply of 290 trolleybuses needed to complete the conversion of tramways to trolleybus operation north of the Thames. It brings the total of such vehicles delivered and on order to 1,669. A feature of the orders is that 175 of the vehicles are chassisless—a method of construction resulting in a lighter bus. The whole of the body is built on a frame and lowered on to the wheels. The orders have been placed as follow :—

Associated Manufacturers of Electrical Traction Equipment Limited : 290 sets of electrical equipment.
Associated Equipment Co. Ltd. : 115 standard chassis and 25 chassisless trolleybuses.
Metropolitan-Cammell-Weymann Motor Bodies Limited : 150 chassisless trolleybuses with A.E.C. units.
Birmingham Railway Carriage & Wagon Co. Ltd. : 90 bodies.
Park Royal Coach Works Limited : 25 bodies.

Bayliss, Jones & Bayliss Limited has received an order from the Buenos Ayres Great Southern Railway for 100,000 kg. of steel fishbolts and nuts.

The Büchi Syndicate has received an order for 16 turbo-charging sets for application to 220-b.h.p. Saurer engines being installed in railcars for the Italian State Railways. The Simmeringer Waggon-und Maschinenfabrik A.G., of Vienna, has ordered 10 Büchi superchargers for 425-b.h.p. railcar oil engines.

The Bombay, Baroda & Central India Railway Administration has placed the following orders to the inspection of Messrs. Rendel, Palmer & Tritton :—

Webster & Bennett Limited : One belt-driven double standard vertical boring and turning mill and one electrically-driven duplex vertical boring and turning mill.
J. Stirk & Son Limited : One belt-driven planing machine.
The Butler Machine Tool Co. Ltd. : Two belt-driven slotting machines.
Dean, Smith & Grace Limited : Three belt-driven centre lathes and one electrically-driven centre lathe.
Follows & Bate Limited : Two combined paint mixing and grinding machines.
W. Asquith Limited : One electrically-driven radial drilling machine.

Alley & MacLellan Limited has received an order from the Bengal-Nagpur Railway Administration, to the inspection of Messrs. Rendel, Palmer & Tritton, for two motor-driven vertical reciprocating air compressors having a capacity of approximately 200 cu. ft. of free air per min. at 100-lb. gauge pressure, for installation at Gorakhpur.

Sheffield Victoria Station Modernisation

G. Longden & Sons Limited has received a contract from the L.N.E.R. for important work in connection with the comprehensive scheme of modernisation and improvement to be carried out at the Victoria station, Sheffield. The improvements include an entirely new station frontage, new booking hall and enquiry offices, the construction of new lavatories in the subway, and the reconditioning of certain public rooms on the platforms. The whole appearance of the station is to be smartened up by the use of coloured tiles in the construction work and the provision of stainless steel fittings. The new booking hall will be considerably enlarged as compared with the present accommodation, and for the convenience of visitors to the Royal Victoria Station Hotel a new entrance to the booking hall is to be provided on the hotel side. The movement of vehicular traffic at the entrance to the station will be facilitated by an extension of the road space in front of the new station entrance, and the lighting of the station approach road will be modernised and illuminated signs provided at the foot of the approach road. An interesting feature of the scheme is that it involves the removal of the Great Central war memorial. Great care is being exercised in this matter and a new site has been chosen for the war memorial within the enclosure of the new booking hall. The work is expected to occupy some five or six months and a start is to be be made by the contractor at once.

The Crown Agents for the Colonies have recently placed the following orders :—

Air Pumps Limited : Air compressor plant.
Chloride Electrical Storage Co. Ltd. : Battery materials and lighting cells.
W. T. Henley's Telegraph Works Co. Ltd. : Cable.
British Insulated Cables Limited : Cable.
N. Hingley & Sons Limited : Cable.
Callender's Cable & Construction Co. Ltd. : Cable.
General Electric Co. Ltd. : Cable, telephones.
C. Richards & Sons Limited : Clip bolts.
Yorkshire Copper Works Limited : Copper tubes.
F. Smith & Company : Copper wire.
J. Wilkes Sons & Mapplebeck Limited : Copper wire.
T. Bolton & Sons Ltd. : Copper wire.
Cellactite & British Uralite Limited : Corrugated sheets.
Ruston & Hornsby Limited : Generating plant, and producer gas engines.
J. Lang & Sons : Lathes.
Whitelegg & Rogers Limited : Locomotive grease lubricators.
Wolverhampton Corrugated Iron Co. Ltd. : Mild steel sheets.
Vacuum Oil Co. Ltd. : Oil.

The Vulcan Foundry Limited has received an order from the New Zealand Government Railways for ten diesel-mechanical railcars with 250-b.h.p. Vulcan-Frichs oil engines and Wilson epicyclic gearboxes.

Matheson & Co. Ltd. has placed the following orders in conjunction with the Chinese Government Purchasing Commission under the King-Kan Railway Loan Agreement :—

Guest Keen Baldwins Iron & Steel Co. Ltd. : 500 tons of fishplates.
Guest Keen & Nettlefolds Limited : 212 tons of dog-spikes and 45 tons of fishbolts.

Leyland Motors Limited has received orders from railway-associated road transport operators for passenger vehicles as follows :—

Crosville Motor Services Limited : 12 oil-engined Titans and 60 oil-engined Tigers.
Western S.M.T. Co. Ltd. : 20 oil-engined Titans.
Southdown Motor Services Limited : 12 oil-engined Tigers.
Yorkshire Traction Co. Ltd. : Six oil-engined Titans.
Yorkshire Woollen District Transport Co. Ltd. : Six oil-engined Titans and 18 oil-engined Tigers.
Yorkshire Traction Co. Ltd. : Six oil-engined Titans and 24 oil-engined Tigers.
Western Welsh Omnibus Co. Ltd. : 47 oil-engined Tigers.

The Great Western Railway announces the following works to be undertaken :—

Old Oak Common.—Two new engine pits are being provided at Old Oak Common on a new outgoing road which will be constructed to give an improved curve. The existing road to the pit now used will be converted to a dead end siding. Contemporaneously with these works, an emergency exit from the engine shed will be constructed and improved watering facilities provided.

Tyseley.—In the last few years there has been a gradual withdrawal of non-corridor stock, and the corresponding increase in corridor stock of nearly 1,000 vehicles has much increased cleaning work in dealing with corridor lights, lavatories, &c. At Tyseley carriage shed, improved facilities for watering, gassing, cleaning, &c., are to be provided.

The Argentine State Railways Administration is calling for tenders, to be presented in Buenos Aires by June 15, for the supply and delivery of three steel spans together with bearers and accessories for railway bridges. Firms desirous of offering steel spans of United Kingdom manufacture can obtain further details from the Department of Overseas Trade.

Tenders are invited by the Bengal-Nagpur Railway Administration, receivable by the Controller of Stores, Kidderpore, by June 14, for the supply of mild steel bolts, nuts, rivets, and washers ; train-lighting, belting, and fasteners ; rubber hose pipes, rings, springs, and washers ; cotters and split-pins ; vacuum brake fittings and roofing materials.

Hancock & Co. (Engineers) Ltd., of Croydon, asks us to state for the information of its customers, among whom some doubt may have arisen, that this firm has no connection with any other concern marketing an oxygen cutting machine.

OFFICIAL NOTICES

South Indian Railway Company Limited

THE Directors are prepared to receive Tenders for the supply of :—

COPPER PLATES

Specifications and Forms of Tender will be available at the Company's Offices, 91, Petty France, Westminster, S.W.1.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Company, Limited, marked "Tender for Copper Plates," with the name of the firm tendering, must be left with the undersigned not later than 10 a.m. on Friday, the 3rd June, 1938.

The Directors do not bind themselves to accept the lowest or any tender.

A charge, which will not be returned, will be made of 10s. for each copy of the Specification.

Copies of the drawings may be obtained at the Offices of the Company's Consulting Engineers, Messrs. Robert White & Partners, 3, Victoria Street, Westminster, S.W.1.

E. A. S. BELL,
Managing Director.

91, Petty France,
Westminster, S.W.1.
25th May, 1938.

Bengal-Nagpur Railway Company Limited

THE Directors are prepared to receive Tenders for :—

1,750 CARRIAGE AND WAGON TYRES.

Specification and Form of Tender can be obtained at the Company's Offices, 132, Gresham House, Old Broad Street, London, E.C.2, on or after 26th May, 1938.

A fee of 20s. will be charged for each copy of the Specification, which is *NOT* returnable.

Tenders must be submitted not later than Noon on Friday, 10th June, 1938.

The Directors do not bind themselves to accept the lowest or any Tender, and reserve to themselves the right of reducing or dividing the order.

By Order of the Board,
T. R. WYNNE,
Managing Director.

DIESEL Locomotive, second-hand, to haul ten 10-ton wagons up gradient 1 in 100. Price, particulars, and where viewed.—Box 255, c/o THE RAILWAY GAZETTE, 33, Tothill Street, London, S.W.1.

Assistant Engineer

REQUIRED for the Iraq State Railway for three years. Salary Iraq Dinars 70 a month (I.D. 1 equals £1). Free passages and liberal leave on full salary. The post is not pensionable, but there is a Provident Fund Scheme. Candidates, not over 40 years of age, must be Associate Members of the Institution of Civil Engineers or hold an engineering degree recognised as granting exemption from sections A and B of the A.M.I.C.E. examination; have had practical experience on a Railway.

Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience and mentioning this paper to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting M/5904.

OFFICIAL ADVERTISEMENTS

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Thursday. All advertisements should be addressed to :—*The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

RAILWAY AND OTHER REPORTS

Bombay, Baroda & Central India Railway Company.—The directors will propose, at the general meeting to be held in July next, the payment, in addition to the half-year's guaranteed interest of £1 10s. per cent., of a final dividend for the financial year ended at March 31, 1938, of £1 10s. per cent., making a total payment in July next of £3 per cent., less income tax. The return on the capital stock for the whole year will therefore be £6 per cent., less income tax, the same as for the previous year.

Oxford Transport Trust Limited.—This company is controlled jointly by the City of Oxford & District Tramways Co. Ltd. and the British Electric Traction Co. Ltd. (through the National Electric Construction Co. Ltd.). It is a partner with the G.W.R. in controlling the City of Oxford Motor Services Limited, the undertaking which maintains the 'bus services in Oxford and neighbourhood. The profit for the year ended March 31, 1938, was £10,767, to which must be added £1,808 brought forward, making a total of £12,575. The directors have paid an interim dividend of 3 per cent. free of income tax, and recommend a final dividend of 5½ per cent. tax-free, and that £2,161 be carried forward.

Stewarts and Lloyds Limited.—The accounts for the year 1937 show that the net profit was £1,929,314, compared with £872,795 for 1936. Adding £170,756 brought in gives a total of £2,100,070. The following appropriations are made : £250,000 to special depreciation, £550,000 to tax reserve, £300,000 to stock reserve, and £150,000 to contingencies reserve. Preference dividends take £100,443, and for the 12½ per cent. dividend on the deferred stock £579,468 is required, leaving £170,159 to be carried forward. For 1936 the deferred dividend was 7½ per cent.

Potteries Motor Traction Co. Ltd.—This company, a subsidiary of British Electric Traction Co. Ltd., earned in 1937 a profit of £84,273, against £83,839 for 1936. Adding £24,732 brought forward makes a total available of £109,005. The directors have again transferred £30,000 to reserve and recommend a final dividend of 6 per cent., making 10 per cent. for the year, the same as for 1936, and leaving £24,880 to be carried forward.

Quicktho (1928) Limited.—Net profits, after tax, for the year ended January 31 last amounted to £3,974 (against £5,658 for the previous year), to which is added £1,662 brought forward. It is proposed to pay a dividend for the year of 4⅛ per cent. (the same), to place £500 to general reserve, and to carry £1,360 forward. The decline in profits is attributed entirely to a falling off in turnover during the latter part of the year. The company has acquired a controlling interest in a new company—Changers Limited—formed to purchase the patents of and to manufacture cash changing machines.

Callender's Cable & Construction Co. Ltd.—Gross profits for the year 1937 reached the new high record of £924,990, an increase of £91,350 over the figure for the previous year. Net profit, after providing for repairs and maintenance, general expenses, &c., was £621,490, against £581,866. Deducting £60,000 for depreciation, £100,000 for income tax and N.D.C., and £13,500 for debenture interest, leaves £447,990 earned for dividends. Preference dividends take £56,000, and it is proposed again to pay an ordinary dividend of 15 per cent. for the year, together with a cash bonus of 5 per cent. (absorbing £224,783), and to carry forward £565,023, against £397,817 brought in. A general increase in orders for mains of every class was experienced. There was a growth also in the demand for light castings. Export trade has also expanded satisfactorily and old customers of the company have increased their requirements.

Parliamentary Notes

L.M.S.R. Bill

The Unopposed Bills Committee of the House of Lords reported this Bill on May 19 for third reading.

L.P.T.B. Bill

The London Passenger Transport Board Bill was read a second time in the House of Lords on May 25. Nine petitions against the Bill have been deposited.

Forthcoming Meetings

May 27 (*Fri.*).—**Société Nationale des Chemins de fer Belges** (Ordinary General), 34, Rue de Stassart, Brussels, at 3 p.m.

June 9 (*Thurs.*).—**Société Anonyme des Chemins de fer de Tournai à Jurbise et de Landen à Hasselt (en liquidation)** (Ordinary General), 19, Rue des Cultes, Brussels, at 11 a.m.

Forthcoming Events

May 30 (*Mon.*).—Indian State Railways, at East India United Service Club, 16, St. James's Square, London, S.W.1, 7 for 7.30 p.m. Annual Dinner.

May 30–June 4.—Institution of Mechanical Engineers, at Cardiff. Summer Meeting.

June 2-7.—Railway Students' Association, at South Wales. Convention.

June 8-12.—Institution of Locomotive Engineers, at Glasgow. Summer Meeting.

June 15 (*Wed.*).—Institution of Civil Engineers, Great George Street, London, S.W.1, 7.45 p.m. Conversazione.

June 17-21.—Stephenson Locomotive Society. Summer Tour to Ireland and Western Scotland.

June 20–22.—Industrial Transport Association, at Hull. Annual Congress.

XUM

Railway Share Market

The stock and share markets have maintained a relatively steady undertone despite the tension in international affairs at the beginning of the week. In many cases earlier declines in prices were partly regained, although, apart from gold mining shares, all sections of the Stock Exchange have again been inactive. Home railway stocks have developed a firmer tendency than ruled earlier in the week and fractional gains have been shown. Sentiment benefited from the statements at the recent meeting of the Railway Rates Tribunal, which have been taken to indicate that there are reasonable prospects of traffic receipts developing a better tendency in the remainder of the year. The past week's traffics, although disappointing, were in accordance with general market expectations, as they compare with the Whitsun holiday period of last year.

Southern deferred was lower at **19**, as the decline in traffics was larger in this case than had been anticipated, and the preferred stock at **74½** was also slightly lower than at the beginning of the week. Nevertheless, there is a possibility of a much improved trend in the railway's receipts, before long, granted weather conditions are favourable. Great Western was subsequently firmer around **51¾**, aided by the belief that there are reasonable grounds for budgeting for a dividend of at least **3** per cent. for the current year. L.M.S.R. ordinary was lower at **18**, but the stock also developed a steadier tendency later, as did the **4** per cent. preference and **4** per cent. **1923** preference stocks at **67½** and **50½** respectively. L.N.E.R. first preference changed hands around **50**, and the second preference around **17**. London Transport "C" was firm at **76**. Guaranteed stocks and debentures were again well maintained, and have been influenced by the firmness which developed in British Government securities.

Partly owing to the surrounding tendency of markets a steadier trend was observable in foreign railway stocks. Argentine railway securities were again very inactive, although some inquiry was reported for the debentures of the leading companies, buyers being attracted by the generous yields. Among preference stocks B.A. Gt. Southern **5** per cent. preference was probably most active, and the better demand was attributed to hopes that the full dividend will be paid; the company's **4** per cent. debentures were better at **67**. An improved showing was also made by the **4** per cent. debentures of the Central Argentine and B.A. Western railways. Some profit-taking developed in Cordoba Central debentures. Profit-taking also resulted in reduced prices for Nitrate Railways and Antofagasta ordinary and preference stocks, but there was a steadier tendency in San Paulo, which regained part of an earlier loss. American railway securities were inclined to improve. There was some demand for Canadian Pacific stocks on the assumption that recent developments have increased the possibility of an eventual amalgamation between the Canadian Pacific and Canadian National Railways. C.P.R. **4** per cent. debenture and preference stocks were better, and the shares changed hands up to **5⅝**. Brazilian stocks showed little movement.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1937–38	Week Ending	Traffics for Week: Total this year	Traffics for Week: Inc. or Dec. compared with 1937	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1937	Prices: Lowest 1937	Prices: May 25 1938	Yield % (See Note)
				£	£		£	£	£					
South & Central America	Antofagasta (Chili) & Bolivia	834	22.5.38	17,530	+ 3,460	21	345,540	354,550	— 9,010	Ord. Stk.	29	10¼	19	Nil
	Argentine North Eastern	753	21.5.38	12,506	+ 1,917	47	426,631	412,107	+ 14,524	"	19¼	6	5	Nil
	Argentine Transandine	—	—	—	—	—	—	—	—	A. Deb.	93½	60	85	411/16
	Bolivar	174	Apr., 1938	3,700	- 2,300	18	15,600	23,200	- 7,600	6 p.c. Deb.	91½	5	8½	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	17	9	5½	9 1/16
	Buenos Ayres & Pacific	2,806	21.5.38	88,772	— 24,876	47	4,157,512	4,498,492	— 340,981	Ord. Stk.	17⅛	5½	5	Nil
	Buenos Ayres Central	190	7.5.38	890,500	- 846,200	45	85,150,300	86,285,400	—$1,135,100	Mt. Deb.	41½	18	11½	Nil
	Buenos Ayres Gt. Southern	5,084	21.5.38	128,908	— 6,638	47	7,019,415	7,050,142	— 30,727	Ord. Stk.	3¾	1¾	11	Nil
	Buenos Ayres Western	1,930	21.5.38	41,377	— 6,883	47	2,129,777	2,357,026	— 227,249	"	3¼	1¼	7½	Nil
	Central Argentine	3,700	21.5.38	105,834	— 44,959	47	5,638,314	7,222,607	— 1,584,263	"	3¼	1¾	8	Nil
	Do.	—	—	—	—	—	—	—	—	Did.	20½	4½	4	Nil
	Cent. Uruguay of M. Video	972	14.5.38	20,529	+ 2,905	48	839,071	815,502	+ 23,569	Ord. Stk.	6⅞	2	2¼	Nil
	Cordoba Central	1,218	—	—	—	—	—	—	—	Ord. Inc.	6¼	1½	3	Nil
	Costa Rica	188	Mar., 1938	36,015	+ 6,498	39	233,338	171,651	+ 61,687	Stk.	38	27	26½	7 9/16
	Dorada	70	Apr., 1938	14,100	— 300	18	60,900	62,400	— 1,500	1 Mt. Db.	107	106	106	5⅝
	Entre Rios	810	21.5.38	14,634	+ 1,557	47	668,422	601,337	+ 67,085	Ord. Stk.	19 7/16	6	5	Nil
	Great Western of Brazil	1,092	21.5.38	5,500	— 500	21	153,100	160,800	— 7,700	Ord. Sh.	5¼	1⅛	1¼	Nil
	International of Cl. Amer.	794	Feb., 1938	$477,297	— $42,015	9	$964,439	$1,033,251	— $68,812	—	—	—	—	—
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	2/-	1/-	1½	Nil
	La Guaira & Caracas	22¾	Apr., 1938	5,055	— 1,150	18	19,730	23,080	— 3,350	Stk.	8½	6	8½	Nil
	Leopoldina	1,918	21.5.38	26,065	— 6,184	21	375,087	451,213	— 76,126	Ord. Stk.	9¼	3	2	Nil
	Mexican	483	21.5.38	$326,000	— $21,000	21	$6,196,000	$6,338,800	— $142,800	"	1½	1⅛	5/16	Nil
	Midland of Uruguay	319	Apr., 1938	9,614	+ 888	44	95,899	87,736	+ 8,163	"	1⅞	1½	1½	Nil
	Nitrate	386	15.5.38	5,896	— 498	20	69,025	70,975	— 1,950	Ord. Sh.	31/16	2	11 5/16§	5⅛
	Paraguay Central	274	21.5.38	$4,165,006	+ $107,000	47	$148,524,000	$138,923,000	+$9,601,000	Pr. Li. Stk.	84	79¼	62½	9⅝
	Peruvian Corporation	1,059	Apr., 1938	70,108	— 26,974	44	810,864	827,889	— 17,025	Pref.	14⅝	4½	2½	Nil
	Salvador	100	14.5.38	¢13,300	— ¢16,450	46	¢917,375	¢1,119,208	— ¢201,833	Pr. Li. Db.	23½	21½	22½	Nil
	San Paulo	153½	15.5.38	34,358	+ 2,472	20	588,525	607,542	— 19,017	Ord. Stk.	98½	56	41	9⅝
	Taltal	160	Apr., 1938	3,030	+ 230	44	34,985	34,610	+ 375	Ord. Sh.	17/16	11/16	5/8	13 5/16
	United of Havana	1,353	21.5.38	18,774	— 9,129	47	1,167,037	1,292,038	— 125,001	Ord. Stk.	5⅝	31/32	2½	Nil
	Uruguay Northern	73	Apr., 1938	1,002	+ 161	44	9,462	10,134	— 672	Deb. Stk.	10	2	2	Nil
Canada	Canadian National	23,781	14.5.38	638,371	— 128,325	20	12,293,774	13,964,834	— 1,671,060	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	— 4 p.c.	Perp. Dbs.	77	62½	62½	6⅜
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gar.	101⅞	94½	102 2/8§	3⅞
	Canadian Pacific	17,186	14.5.38	470,400	— 77,000	20	9,035,600	9,796,200	— 730,600	Ord. Stk.	18	7¼	5½	Nil
India†	Assam Bengal	1,329	30.4.38	38,100	— 412	4	108,630	108,568	+ 62	Ord. Stk.	86	73½	79	31 5/16
	Barsi Light	202	30.4.38	3,495	— 285	4	13,965	13,342	+ 623	Ord. Sh.	66½	46	60	8 5/16
	Bengal & North Western	2,107	10.5.38	89,484	— 5,561	6	355,179	378,692	— 23,513	Ord. Stk.	317	301	297½	6
	Bengal Dooars & Extension	161	10.5.38	2,913	— 216	6	13,877	13,215	+ 662	"	100	84	85½	7
	Bengal-Nagpur	3,268	10.5.38	199,875	— 8,382	6	800,475	839,332	— 38,857	"	101	89	91½	4⅝
	Bombay, Baroda & Cl. India	3,072	10.5.38	281,850	+ 2,100	6	1,121,475	1,161,900	— 40,425	"	113	110½	110½	5 7/16
	Madras & Southern Mahratta	2,967	10.5.38	162,450	+ 8,004	6	652,125	643,433	+ 8,692	"	110	105	104 2/8§	8⅝
	Rohilkund & Kumaon	571	10.5.38	18,778	+ 498	6	73,713	78,931	— 5,218	"	314	302	303½	5 13/16
	South Indian	2,531½	30.4.38	115,445	— 6,732	4	347,236	357,954	— 10,718	"	103½	99½	102½	4⅝
Various	Beira-Umtali	204	Mar., 1938	84,833	— 656	26	528,588	418,485	+ 110,103	—	—	—	—	—
	Egyptian Delta	620	10.4.38	5,800	— 131	2	5,800	5,931	— 131	Prf. Sh.	31/-	5¼	3¼	Nil
	Kenya & Uganda	1,625	Mar., 1938	279,680	— 4,212	13	802,157	852,979	— 50,822	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb	48⅛	43½	45½	7 11/16
	Midland of W. Australia	277	Mar., 1938	17,966	+ 4,558	39	131,005	119,597	+ 11,408	Inc. Deb.	98	93½	93½	4¼
	Nigerian	1,900	2.4.38	7,885	— 29,742	1	7,885	37,627	— 29,742	—	—	—	—	
	Rhodesia	2,442	Mar., 1938	410,494	+ 564	26	2,512,028	2,109,905	+ 402,123	—	—	—	—	-
	South Africa	13,263	7.5.38	622,053	+ 34,838	6	3,233,359	3,283,710	— 50,351	—	—	—	—	—
	Victoria	4,774	Feb., 1938	794,106	— 61,204	35	6,392,472	6,705,843	— 313,371	—	—	—	—	-

NOTE.—Yields are based on the approximate current prices and are within a fraction of ⅛

† Receipts are calculated @ 1s. 6d. to the rupee. § ex dividend

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements are based on the current rates of exchange and not on the par value

Electric Railway Traction

Sir Ralph Wedgwood on Railway Electrification

SPEAKING in the third of the B.B.C.'s wireless talks on "Transport" on May 12, Sir Ralph Wedgwood, Chief General Manager, London & North Eastern Railway, said that some people thought that we should not reach the full possibilities of speed until the lines were electrified. It was certainly true that an electric locomotive could haul a heavy train at a more constant speed than a steam locomotive, and that over a varied line it could maintain a higher speed between point and point. But it was as a weight-carrier rather than a flyer that the electric locomotive would do its best work. Suburban electrification, dependent on multiple-unit operation and not on the electric locomotive, was a proved success where the passenger traffic was heavy and the goods traffic light. This was particularly the case with London south of the Thames, where there had grown up by far the largest system of suburban electric railways in the world. On the north of the Thames progress had been less rapid, but was making great advances now that the main-line companies and the London Passenger Transport Board had pooled their suburban interests. Apart from London, progress was slow—the traffic was less intense, and the pressure of freight traffic on the available facilities was greater. Still progress was being made, and new sections of suburban line had been electrified in the Liverpool area and on Tyneside within the last few weeks. Main line electrification stood on a different footing. Suburban electrification justified itself by the more intensive service it could give, and the increased revenue it earned thereby. Main line electrification must justify itself as a business proposition mainly on the economies it brought with it; and unfortunately the smaller the scheme the smaller was the proportion the economies were likely to bear to the capital expenditure involved. An experiment to be successful must be made on a big scale or not at all. Such an experiment was in progress on one of the lines connecting Manchester with Sheffield, where heavy grades, long tunnels and intensive traffic gave the most favourable conditions for success, but the work would take some years to complete. Taking the whole of our railways, even those that served the far north of Scotland, they gave a more frequent service than any other country in the world—more than twice as frequent as the French railways and eight times as frequent as in the U.S.A.

Interchange of Current in London

AFTER opposition from various electricity supply companies, a third reading in the House of Commons has been given to the Bill promoted by the London Passenger Transport Board for the exchange of current with the grid. The L.P.T.B. seeks powers to enter into agreements with the Central Electricity Board so that the latter might in time of emergency, particularly in war time, provide the L.P.T.B. with current, or, more generally, *vice versa*. Most of the proposals centre in Greenwich power station, which was transferred from the London County Council on the formation of the Transport Board in 1933. It was built to supply the power for the L.C.C. tramway system, and lies exactly on the Greenwich meridian, where the smoke causes some trouble to the astronomers at the adjacent Royal Observatory, the then Astronomer-Royal not having seen fit to object to the site until the station was built and in operation. But two of the four chimneys have been limited in height to 180 ft. to meet astronomical requirements, whereas the other two are 250 ft. high. Plans are on foot for the re-equipment and reconstruction of the Greenwich plant to give it a total capacity of 112,000 kW. by installing four further B.T.-H. 16,000-kW. turbo-alternator sets to operate at 50 cycles, and which will be supplied with steam at 425 lb. pressure and 780° F. temperature by 16 stoker-fired Yarrow boilers, each with a normal evaporative capacity of 50,000 lb. an hour. At the present time about 250 million kWh. of energy a year are produced. Spare plant above normal requirements will be necessary, and, as it is only likely to be called upon at intervals, the proposals were that it should supply spare current to the grid through a connection at the L.P.T.B. substation at Aldgate. It was stated at a hearing before a Select Committee of the House of Commons that the C.E.B. would be involved in a cost of £100,000, and as a supply would be taken only in case of emergency, the revenue would not meet standing charges. It was proposed, therefore, that the C.E.B. should take the spare current from Greenwich all the time to enable it to meet the charges. The objections lodged by the supply companies were only against the L.P.T.B.'s obtaining current from the grid, but, on provision being made that a supply should be given only in a national emergency, and then only if the authorised undertakings were unable forthwith to give a supply, the opposition was withdrawn.

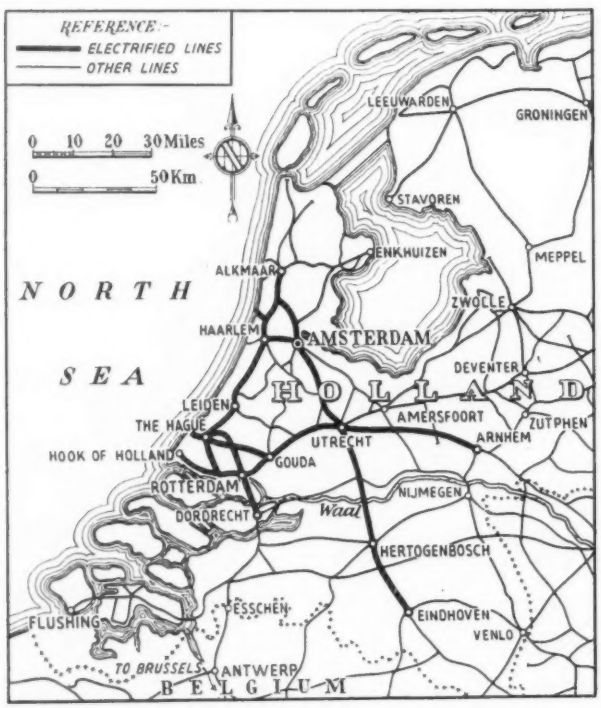
Rectifiers and H.T. Switchgear

THERE has long been an idea, originating we know not where, that with mercury arc rectifier equipments the main switchgear on the high-tension side of the transformer must have a higher rupturing capacity than would normally be used for a plant of the same nominal kVA. as the rectifier transformer. It has been stated that the factors arising under fault conditions not only combine to increase the duty on the a.c. breaker, but also demand a higher dielectric recovery rate, and that in some cases this has resulted in an increase of 50 per cent. on the MVA. rating of the switchgear required. Unnecessary expense in the provision of both a.c. and d.c. switchgear of higher rupturing capacity can be incurred by the stipulation of very close regulation, as the possible short circuit current which would flow under conditions of back-fire or other d.c. short circuit faults might be extremely large. But it is possible that the idea arose originally through the lack of adequate testing facilities for circuit breakers until recent years. Today, the necessary breaking capacity can not only be calculated exactly, but what the circuit breaker is actually capable of doing can be measured correctly. It is possible, too, that the not infrequent paring down of switchgear, as a non-revenue earning constituent of the equipment, has had something to do with the matter, but if the a.c. switchgear *must* be of greater capacity, then it may mean that the rotary converter is not yet dead.

NEW MULTIPLE-UNIT ELECTRIC TRAINS IN HOLLAND

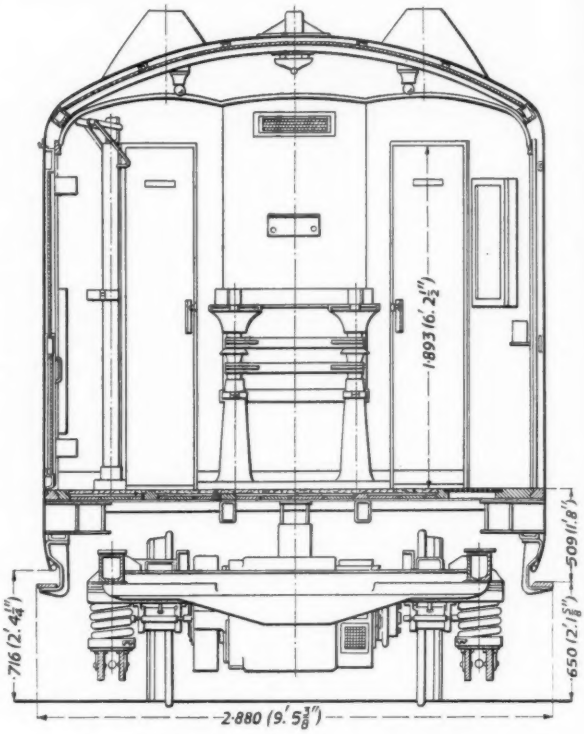
Flexibility in train make-up and 11 to 12 h.p. per ton of tare characterise the latest units

FOR the new electrification scheme of the Netherlands Railways, comprising the equipment at 1,500 volts d.c. of the Utrecht—Amsterdam, Utrecht—Hague, Utrecht—Arnhem, Utrecht—Eindhoven, and Rotterdam—Gouda lines, a total of 53 twin-car and 37 triple-car electric train sets have been built, all to the now familiar Dutch streamlined contour as used for previous electric and diesel trains. The twin-car rakes have seats for 120 passengers in two classes and the triple-car sets have 192 seats. By coupling in multiple-unit, formations of two, three, four, five, six, seven, eight, or more cars can be used. The twin-car sets are articulated, with the articulation bogie as a trailer and the four outer axles motor-driven; they tare 79 tons, and the overall length is 144 ft. 4 in. The triple-car trains are not articulated, and have the eight axles of the two outer cars motor-driven, the centre vehicle being a trailer although it carries a pantograph for use as a spare. These rakes

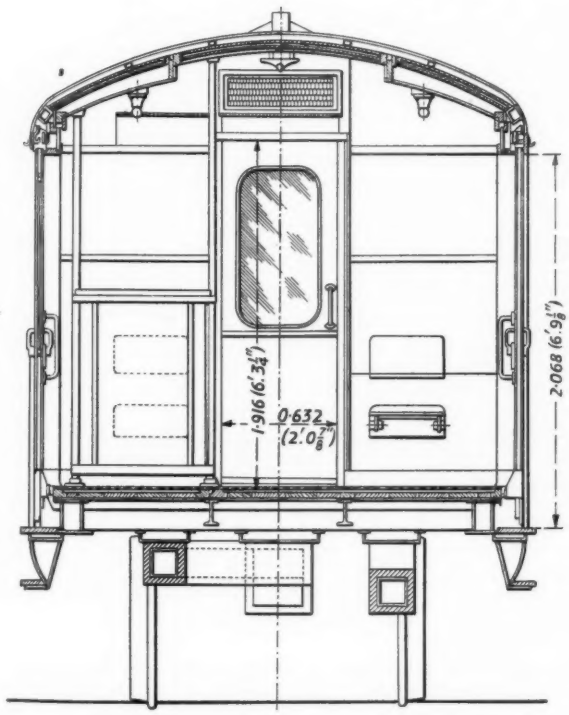


Map of Netherlands Railways' lines now electrified on the 1,500-volt d.c. system

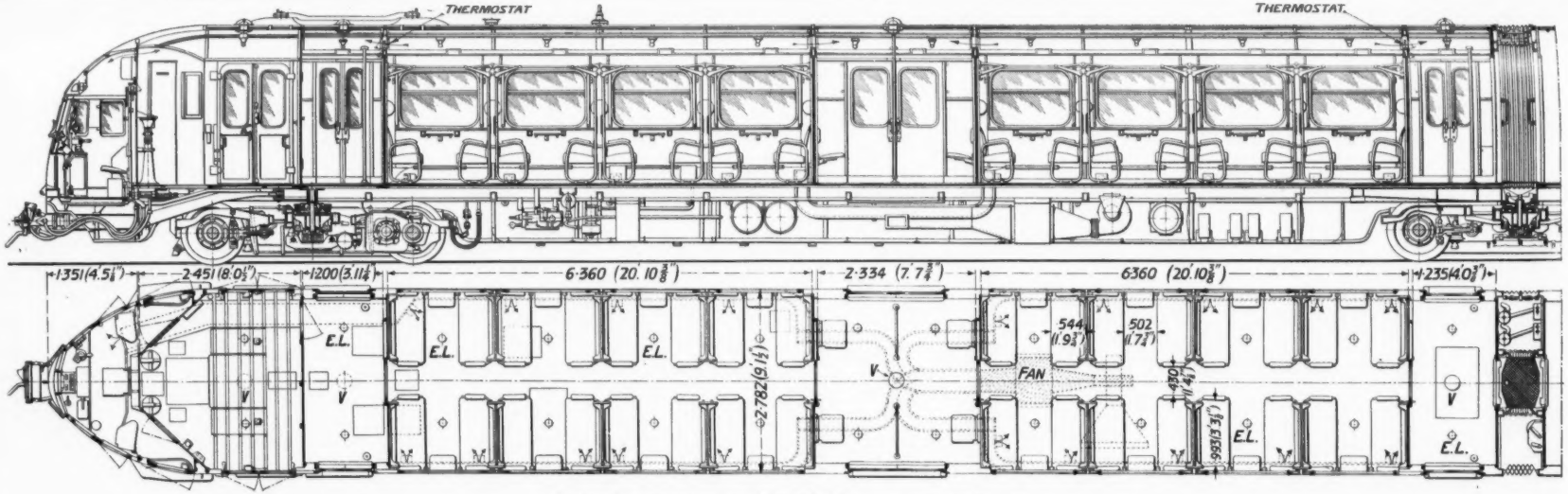
tare 144 tons and measure 239 ft. 4 in. over couplers. All the trains were built by Dutch firms to the designs and requirements of Mr. W. Hupkes, the Chief Mechanical Engineer of the Netherlands Railways. The mechanical portions of the 53 twin-car sets were built throughout at the Utrecht works of Werkspoor N.V., and those of the 37 three-car trains at the Haarlem works of Beijnes and the Rotterdam works of Allan. The nominal top speed is



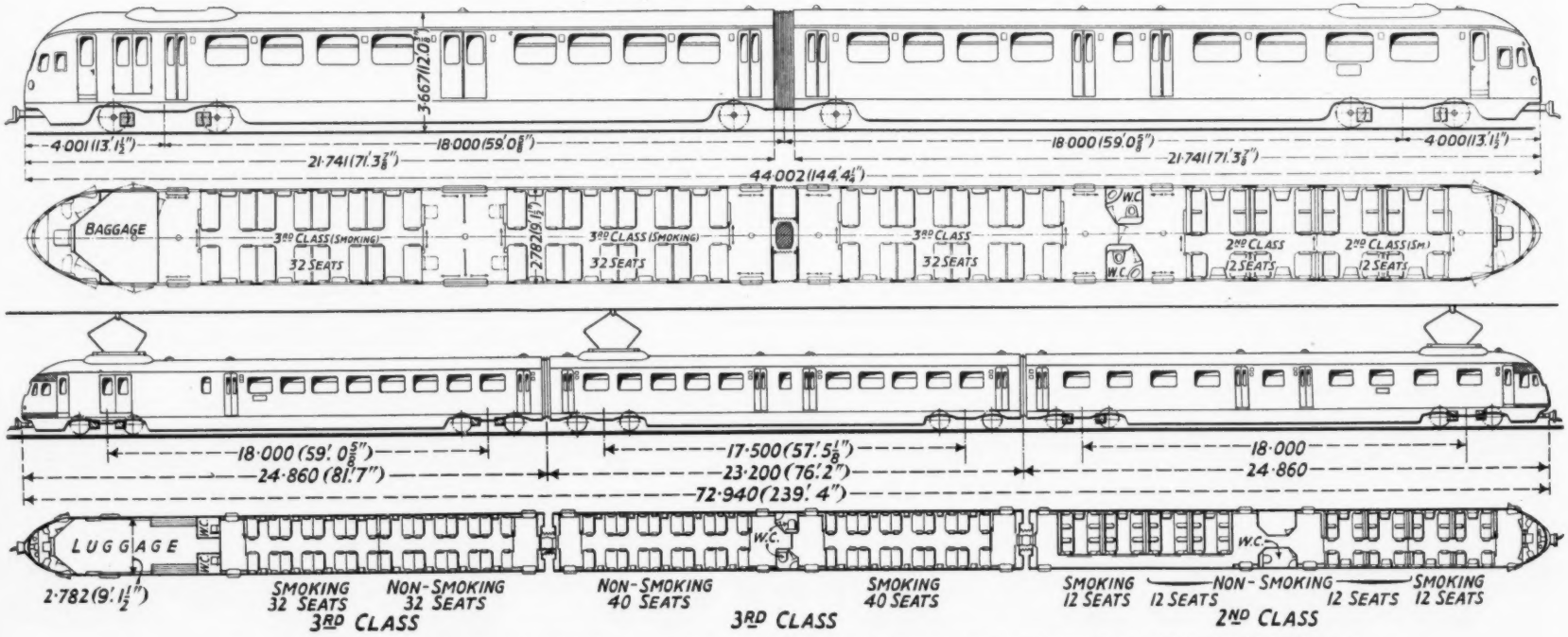
Section of twin-car train through baggage room



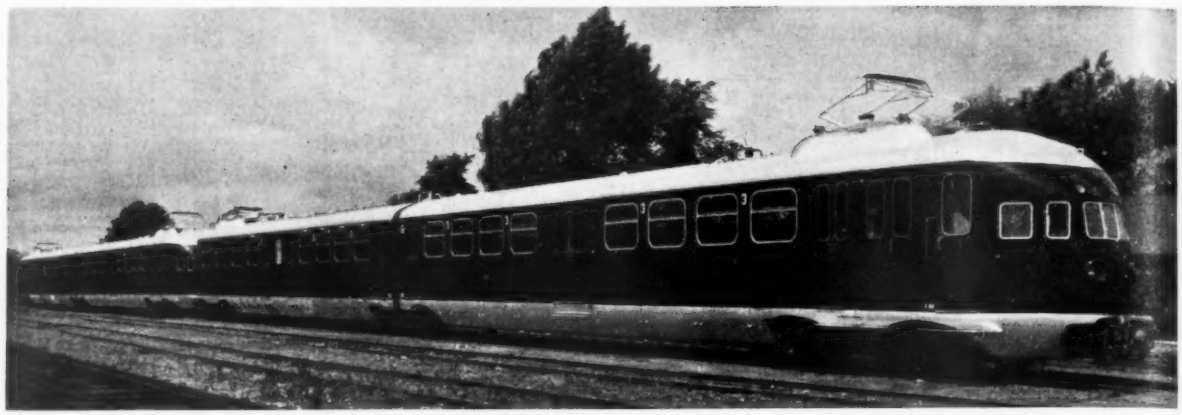
Section through twin-car train at centre of car length



General arrangement of half of a two-car train set



Above : Diagram of twin-car articulated set. *Below : Diagram of three-car non-articulated set, Netherlands Railways*



Two twin-car electric trains of the Netherlands Railways coupled in multiple-unit

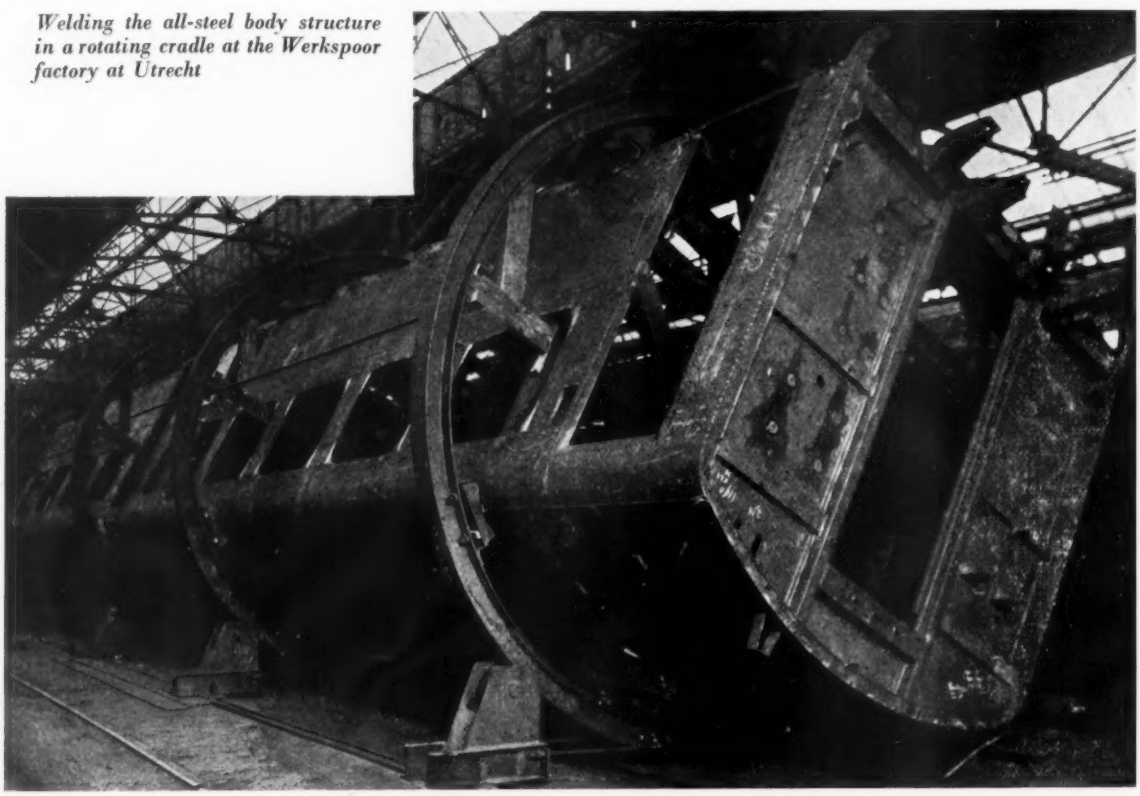
125 km.p.h. (77½ m.p.h.) but on test a speed of 150 km.p.h. (93 m.p.h.) has been attained. The accelerative capacity on the straight level is from rest to 96 km.p.h. (60 m.p.h.) in one minute, and from rest to 120 km.p.h. (75 m.p.h.) in two minutes.

Fabricated of all-welded steel to the form of a tubular girder, the framing of each car is an integral structure with all parts, *e.g.*, side frames and panels, roof, floor and underframing, taking a share in the load, resulting in minimum weight for a given strength. Copper-bearing steel is used throughout the framing in order to minimise corrosion. The electric welding by Werkspoor was carried out with the framing or other parts in jigs rotating horizontally, thus enabling the joint to be brought into the most accessible position and assisting in the production of a first-class weld.

Weight reduction has been assisted by the use of aluminium alloys for the curved side doors, and for such details as the luggage racks and end frames, air ducts, door handles, and coat hangers. The seats are carried on tubular steel frames; those in the third class saloons are arranged two on each side of the centre aisle. In the second class portion the seats are arranged two and one on opposite sides of the aisle in the two-car sets, but in the three-car rakes some of the second class seats are arranged in compartments with a side corridor. The second class seats are upholstered in moquette and those in the third class saloons in green artificial leather. Two lavatories are provided in the two-car sets and four in the triple-car rakes. The standard width entrance and exit doors in the sides are in halves, each part sliding back behind the side panel sheet of the car.

A combined electric heating and forced ventilation system is incorporated. Air is provided by electrically-

Welding the all-steel body structure in a rotating cradle at the Werkspoor factory at Utrecht



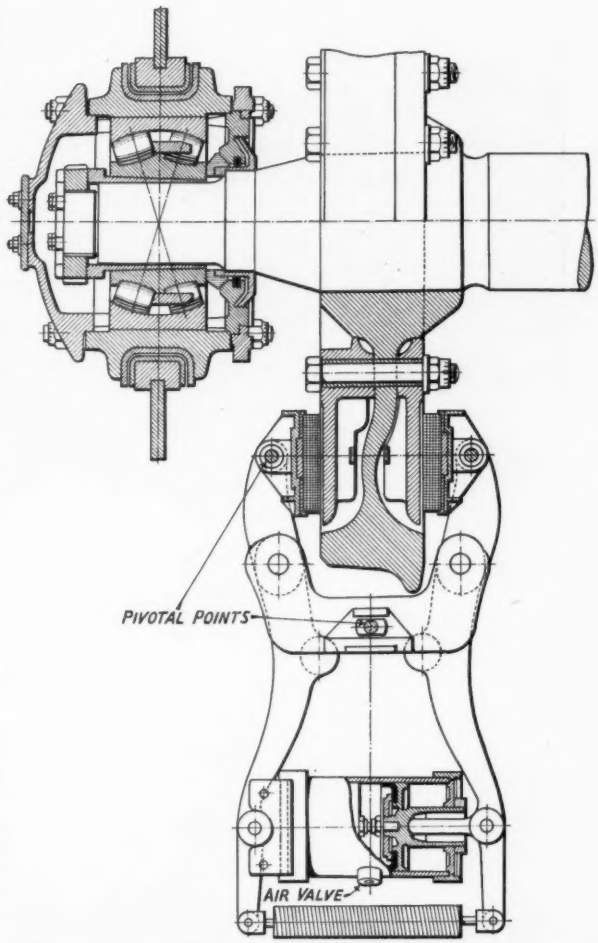
driven compressors and is led into the saloons by ducts arranged along the bottom of the side panels; the used air is expelled through ventilators in the roof. The air temperature is controlled automatically and a greater or lesser part of the incoming air is first taken through a filter by an electrically-driven fan with an 0·3 kW. 1,500-volt motor, and then passed over two 15 kW. h.t. thermostatically-controlled electric resistance heaters located beneath the car floor. In summer the fan is used simply to provide a forced ventilation without any heating. The windows are fixed and the arrangement of their frames is such as to provide an almost smooth contour of the outer panels. The windows are of double glass with an air space between, to provide heat insulation. Above each window is a deep ventilator light which can be raised and lowered. The flooring of the cars is double, and is composed of wood covered with rubber. Between the double flooring, and also between the floor and the rubber covering, layers of Celotex are inserted. The inner side panels are of plywood and between these and the outer steel panels is a layer of Celotex, for insulation against heat and noise. Two layers of the same material are also inserted between the roof and the ceiling as insulation against the heat of the sun.

Bogies and Brakes

Electrically welded construction applied to copper-bearing steel has been used also for the bogie frames, and here again the constituents are held in rotating jigs for welding. Both driving and carrying bogies are of what may be termed Dutch standard construction, with a wheelbase of 9 ft. 10 in., embodying top main side members of box-girder form and swing bolsters supported at each side by a triple set of full elliptical laminated springs. Equalising beams run between the SKF roller-bearing axleboxes on each side, and between them and the main side members are double helical springs supplemented by rubber cushions. The headstocks are of channel section, and the two centre transoms of box-girder form; supplementary cross stretchers take the motor torque reaction through rubber springs. The bolster is fabricated of welded steel plates. The driving bogies have flat pivots, but the articulation bogie of the twin-car set has a double pivot, the upper part slightly concave and the lower part flat. One-piece disc wheels are used.

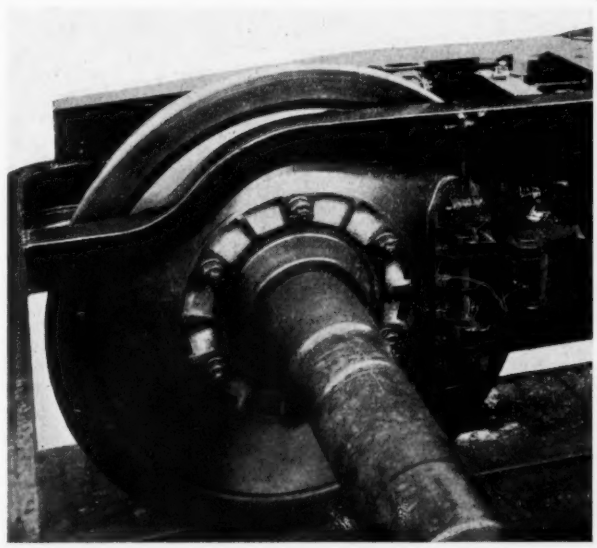
Knorr-Lambertsen air brakes are fitted, and the equipment permits of graduated application and release. The actual rigging and application apparatus is of considerable interest, and from the two illustrations presented herewith it will be seen that the brakes are of the disc type. Each wheel has bolted to it two flat annular disc plates, and brake shoes with Capasco friction surfaces, which bear against the inner and outer disc plates, are applied by a pincers mechanism actuated by individual brake cylinders for each wheel; each cylinder has two opposing pistons, and all the cylinders on a bogie are served by a single triple-valve and auxiliary reservoir. In addition to being gripped by the pincers mechanism the brake shoes are suspended by links from longitudinal stretchers running, between the wheels and the traction motors, from the headstocks to the frame stays which carry the motor nose suspension.

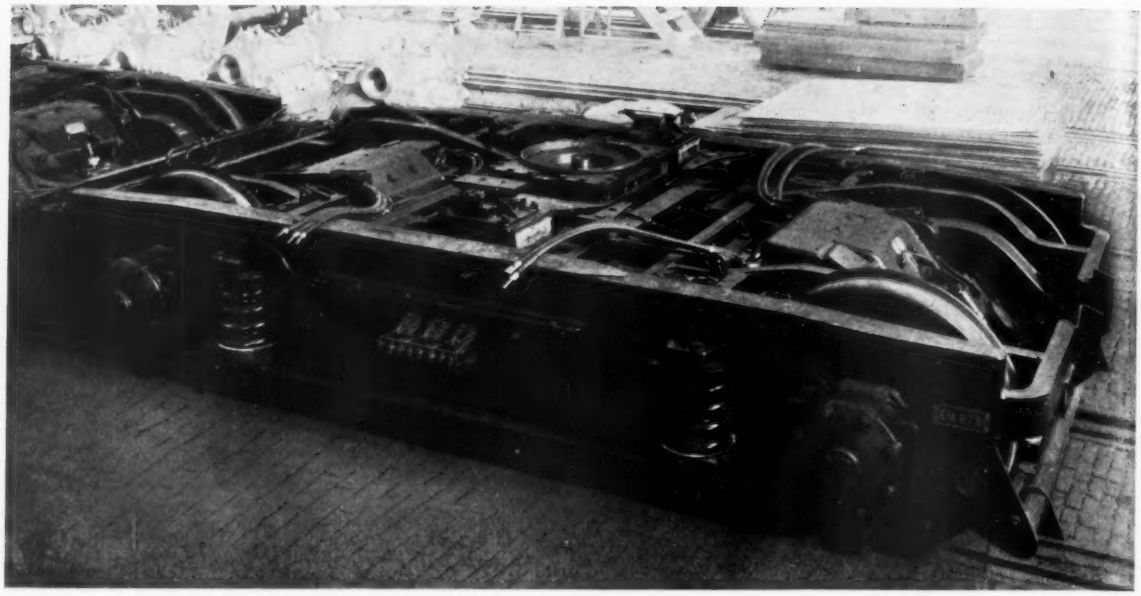
In order to couple or uncouple train sets in the shortest possible time, Scharfenberg automatic couplers have been incorporated at each end of the rake, and they are mounted on the end of a long drawbar running beneath the car floor and pivoted to the underframe portion about 1 ft. 8 in. in front of the driving bogie centre. The Scharfenberg coupler effects the simultaneous and instantaneous coupling or uncoupling of the drawbars, electric circuits, and air pipes. Between the cars of a three-car



Above : Plan of disc brake with individual operating cylinder and pincers mechanism

Below : General view of inner brake disc and friction-lined clasp brake shoes





General view of motor bogie of the new Netherlands Railways electric trains

train are big non-automatic central spring buffers and drawbars arranged as an integral ensemble. The air pipe connections are made by hand, as are the auxiliary electric circuits; the main traction circuits require inter-car connections only as far as the pantographs are concerned. There are vestibule connections between the coaches and these are covered by a full-width canvas bellows which preserves the unbroken outside contour of the train set.

Electrical Equipment

Each motor-coach of a three-car train and each complete twin-car set has four traction motors. These are of the nose-suspended d.c. series type driving the 900 mm. (35½-in.) wheels through single spur gearing with a ratio of 21·61. Two motors are permanently connected in series. The one-hour rating of each motor is 225 h.p. at 675 volts on full field and 258 h.p. on weak field. Four running positions are used, *viz.*, series position with full field; series position with weak field; parallel position with full field; parallel position with weak field. The motor weight is approximately 1,600 kg. (3,530 lb.). The motors were manufactured by Heemaf N.V. of Hengelo; Smit, of Slikkerveer; and by the Metropolitan-Vickers Electrical Co. Ltd. (Sheffield). The electric equipment was installed by Heemaf. The electro-pneumatic control system with sequence drum is used, the electro-valves of which operate at 100 volts. Control and lighting current is provided by a motor-generator set working in parallel with an alkaline battery of 100-amp.hr. capacity. The capacity of the motor generator of the twin-car set is 8·5 kW. As the three-car sets include a small kitchen, a certain amount of energy at 100 volts is needed for heating and cooling purposes, for which reason a motor generator of 15 kW. capacity has been installed.

Welding the bogie frame structure in a rotating cradle

FURTHER SOUTH AFRICAN ACTIVITY.—It is reported that the conversion to 1,500 volts d.c. traction of certain Durban suburban lines of the South African Railways has been sanctioned, and that the electrification of 28 miles of line will be completed in about nine months.

SOUTH AFRICAN SHUNTING LOCOMOTIVES.—Ten more Bo-Bo electric shunting locomotives with steeple cabs for the 3,000-volt d.c. lines are to be built by the South African Railways in their own shops, but the electrical equipment and bogies are being purchased from outside firms.

BERLIN ELECTRIFIED LINES.—During 1936 the Berlin Stadt, Ring, and Vorortbahnen, belonging to the German State Railway, carried 408 million people, ran 16 million train miles, carried 3,500 million ton-miles, and consumed 328 million kWh. of energy. The number of passengers carried was 35½ per cent. of the total rail and road traffic in Berlin.

NOTES AND NEWS

Höllental Locomotive Mileage.—The first Siemens-Schuckertwerke 20-kV. 50-cycles single-phase locomotive on the Höllental section of the Reichsbahn has now covered about 85,000 miles. It was put into traffic in June, 1936.

Leningrad Underground.—The Soviet Central Planning Committee is now examining a detailed project for a 9-mile electric subway system in Leningrad, and plans for a more extensive system are being drawn up.

These Towns Want Electric Trains.—Since the turn of the year, meetings have been held, with the object of getting an electric railway service, at Birmingham, Manchester, Oldham, Barnsley, and Torquay. An underground line is part and parcel of Manchester's desires.

Tyneside Electrification.—A full service of electric trains was brought into use on the Newcastle to South Shields line of the L.N.E.R. on May 2. The 20-min. service provided by the steam trains has been retained, but the journey time has been cut from 34 to 27 min.

German Mixed Traffic Locomotives.—During the past year the Siemens-Schuckertwerke has supplied 38 heavy Bo + Bo single-phase electric locomotives of Class E.44 to the Reichsbahn, and at the moment is building the electrical equipments for two of the new E.19 express locomotives with a one-hour rating of 4,000 kW.

New Southern Electric Line.—The new electrified line from Motspur Park to Chessington Grange, which is described on pages 1020–1024 of THE RAILWAY GAZETTE this week, is to be opened to traffic as far as Tolworth on Sunday, May 29, with a service of three trains an hour between Tolworth and Waterloo.

Michelin Electrics.—For operation on the 1,500-volt d.c. Paris-Le Mans line of the French National Railways, the Michelin Company is building a pneumatic-tyred motor-coach in which current is taken from the overhead line or from a third rail and is returned to the running rails through contact shoes.

Buenos Aires Underground.—The equipment of the Buenos Aires Underground (Chadopyf) is being extended by the acquisition of 10 double-unit and 15 single-unit motor-coaches, built by Siemens-Schuckertwerke in conjunction with Orenstein & Koppel A.G., and by two Brown Boveri 2,000-kW. mercury arc rectifiers for installation in the Boedo substation.

Electric Locomotives for Switzerland.—The Swiss Federal Railways have ordered five of the standard C-type single-phase electric shunting locomotives, and these will bring the total number of this class up to 51. In addition, three light but powerful Bo—Bo locomotives have been ordered, and this wheel arrangement is quite a novelty on the Swiss Federal lines.

A Polish Grid?—A Polish mission headed by the chairman of the Polish Electrical Commission, has been in England studying the grid in connection with proposals to erect a similar grid in Poland. It is understood that Metro-Vick, which, in conjunction with the English Electric Co. Ltd., electrified the Warsaw suburban lines, has been advising the Polish Government in its consideration of this work.

Fast French Motor-Coaches.—Five single-unit 1,500-volt d.c. motor-coaches for a top speed of 87 m.p.h. are being built for the Paris-Le Mans line of the French National Railways. They will have a carrying capacity of 130 passengers and will be driven by four nose-suspended motors with a one-hour rating of 212 h.p. at 50 m.p.h. and a continuous output of 160 h.p. at 56 m.p.h. Two pairs of two motors will be connected permanently in series, and will drive 35-in. wheels through gears with a ratio of 2·63 : 1.

More Trains for Norway.—The Norwegian Brown Boveri Company is delivering six double-bogie single-phase motor-coaches to the Norwegian State Railways; these are similar to the vehicles built in 1936 and described in the issue of this Supplement for April 2, 1937. The same firm is also supplying electrical equipment for six driving trailers and through bus lines for six trailers, all of which vehicles will be used to form six three-car trains. Three trains are for the Oslo-Ski line and three for the Oslo-Sandvika section.

Wireless Interference.—Complaints of interference with radio reception began to be received as soon as the Paris-Le Mans line of the French National Railways was turned over to 1,500-volt d.c. electric operation in May, 1937. Smoothing equipment installed in the substations cured most of the trouble, and attention is now being devoted to eliminating sparking between the pantographs and the contact wire. Two of the locomotives are now running experimentally with a device to maintain constant contact between the pans and the overhead wire.

High-Power Swiss Locomotive.—The new electric locomotive for the Gotthard route, the order for which was recorded in our issue of February 4, is to have the 1-Bo-1-Bo-1 + 1-Bo-1-Bo-1 wheel arrangement. On the one-hour rating the motor output will be 8,400 kW. at 46·5 m.p.h., giving a tractive effort at the wheel rims of 88,000 lb. The top speed in service will be 68 m.p.h. The estimated weight is 244 tons, of which 172 tons normally will be adhesive, but a device for increasing the load on the driving axles to 172 tons is to be fitted. Over buffers the length will be about 112 ft.

Swiss Conversion.—The standard-gauge line connecting Flamatt, on the Berne-Fribourg line, via Laupen, with Gümmenen, on the Berne-Neuchâtel Railway, has been electrified on the single-phase 15,000-volt system. Electric traction was begun on January 31, and the line is for the present being operated by a locomotive loaned from the Swiss Federal Railways, and which is one of the two built in 1903 by the Oerlikon works for experiments on the Seebach-Wettingen line, near Zurich. The Gümmenen-Flamatt line, or Sensetalbahn, is 11 km. in length, single track throughout, and was opened in 1904.

Electric Train Speeds in Sweden.—The Swedish Railway Board has started an inquiry into the question of the speed of the electric locomotives used on the State Railways. It is desired that these locomotives should be built for a normal speed of some 120 km.p.h. (75 m.p.h.) without making the engines too heavy. In connection with the scheme for the electrification of the State line between Långsele and Boden, which will probably be decided on by the Riksdag, the State Railways will have to order a number of new electric locomotives, and it is the present intention to build these locomotives for a top speed of 75 m.p.h. It is proposed to raise the speed limit to this figure gradually as the permanent way is strengthened.

Twin Systems at Frisco.—Two electric railroads, using different means of current collection and operating on different voltages, are using the same tracks in crossing the San Francisco (Cal.)-Oakland Bay bridge. Trains of the

Key System operate on 600 volts third rail, while the Southern Pacific's East Bay interurban system operates on 1,200 volts overhead line. Power for the train operation is supplied by 20,000 kW. of General Electric mercury-arc rectifiers, and the G.E.C. have also supplied the transformers, automatic control, and accessory equipment. Four 2,000-kW. and two 1,000-kW., 625-volt rectifiers are installed for the 600-volt third rail Key System, and four 2,500-kW., 1,300-volt units for the Southern Pacific 1,200-volt overhead system.

Belgian Electrification.—A commission under the presidency of M. Marck, Belgian Minister of Transport, met recently to examine the proposals of a sub-commission to electrify (*a*) the Brussels-Charleroi route and the Brussels suburban services to Braine-le-Comte, Ottignies, Alost, and Louvain; (*b*) Braine-le-Comte to Mons, Alost to Ghent, and Louvain to Liége; and (*c*) the Ottignies-Namur section of the Luxembourg main line, and the Brussels-Ostend main line. It was suggested that these three schemes might follow one another as part of a definite plan. The commission agreed on the conversion of the Brussels-Charleroi line, and that the National Railways should be asked to submit fresh proposals, but M. Marck made definite reservations with regard to the State's share in financing such work.

Electrification in South Africa.—Within a few more months the comprehensive £1,000,000 scheme of electrifying all the passenger train services in the Witwatersrand gold-mining area, together with the line to the Union's administrative capital, Pretoria—131 route miles all told—will be an accomplished fact. Already 95 route miles have been converted from steam to electric traction, including the whole of the 58-mile main Reef line between Randfontein and Springs, enabling considerable acceleration of trains to be effected. Practically the only remaining section to be converted is that between Kempton Park and Pretoria—a distance of 27 miles—which will be completed about the middle of July next. Suburban electrification out of Durban, principally along the northern coastal line, is being undertaken.

The Westchester Line.—The protective committee of the first mortgage bondholders of the New York, Westchester & Boston Railroad, the bankrupt New York outer suburban line which ceased operation on December 31 last (see issue of this Supplement for December 10, 1937), is making proposals to reopen the line, with a service of 129 trains a day, in place of the old 244, and with five of the 36 stations closed. The project assumes reductions in the franchise obligations, real estate taxes, and payments to the New York, New Haven & Hartford Railroad, which guaranteed payment of principal and interest on $19,200,000 out of a total of $22,310,000 of first mortgage bonds. Governor Lehman of New York, has already vetoed a Bill proposing to authorise public ownership and operation of the line, which had been passed by the New York State legislature.

Swiss Summer Timetables.—Additional services to a total of 1·25 million train-km. are provided in the new Swiss Federal timetable, which came into force on May 15. Electric and diesel high-speed railcars and trains account for 767,000 train-km., and in particular one of the two new three-unit trains (described in the December 10, 1937, issue of our *Electric Traction Supplement*), entered regular service with a daily run of 740 km., providing much-needed connections on several routes. Leaving Rorschach at 7.57 a.m. and calling at St. Gall, Winterthur, Zurich, and Aarau, it reaches Berne at 10.54 a.m., after which a return trip is made to Bienne and another to Basle. A new evening service from Berne (leaving at 7.13 p.m.) to Zurich, forms its next duty, arriving at Zurich at 8.49 p.m., with stops at Olten and Aarau. Finally, the return to Rorschach is made, leaving Zurich at 9.05 p.m., calling at Winterthur and St. Gall, and arriving at Rorschach at 10.22 p.m.

General Electrification of Britain.—According to the annual statistical review of the Electricity Commission, the total sales of electricity in Great Britain in 1937 amounted to 17,147 million units. Over 12,885,000 tons of coal and coke were consumed in the generation and the average cost of this was 16s. 8d. a ton, compared with 15s. in 1935-36. There are 141,000 miles of underground mains and overhead transmission lines. At the end of the year the number of consumers was 8,557,000, and upwards of 85 per cent. were domestic consumers.

Electrification in Chile.—The Chilean State Railways have decided to electrify the line between Santiago and San Antonio, the port tending to assume more importance than its neighbour, Valparaiso. The length of the line is 75 miles, and it has been carrying heavy traffic in recent years as the result of the increased export movement. Tonnage figures have surpassed those of Valparaiso, the line between which port and the capital was electrified 15 years ago. The initial investment calls for three electric substations, one portable substation, and other stationary electrical equipment; three electric locomotives; and four electric trains. These trains are independent units of three coaches, with mail and baggage sections as well as separate accommodation for first and third class passengers. The orders involved by this and other railway expansion plans total approximately £650,000, and have been placed with the Ferrostal Works, at Essen. Payment will be by instalments until 1944.

Italian Conversion Work.—The opening of the Milan-Bologna-Ancona main line to 3,000-volt d.c. electric traction is scheduled to take place on October 28 next, and trial runs are expected from the beginning of September. This conversion will enable electrically-hauled trains to be run into Milan from Naples and Rome. The conversion work on the Rome-Leghorn coastal main line also is well forward, and the contact wire is being erected down most of this length. The electrification is being carried out on the 3,000-volt d.c. system, whereas the more northerly part from Modane, via Turin and Genoa, is three-phase. A twin-system station at Leghorn will thus be necessary. The Italian Minister of Communications recently stated that since May, 1937, the State Railways had ordered 122 electric locomotives, 2 streamlined electric trains, and 78 electric motor-coaches. During the course of the present year, 495 route miles of line are due to be turned over to electric traction, and in 1939 a further 212 miles.

Rectifiers for Old American Line.—A new substation containing two 3,000-kW. Westinghouse sectional rectifiers has been erected to feed the Baltimore & Ohio Railroad's electrified line through the Baltimore tunnels, and to replace the existing 5,000-kW. rotary converter substation. This line was electrified in 1895 on the third rail 650-volt d.c. system, and obtained current originally direct from an adjacent power plant; the rotary plant was installed in 1910 when a change-over was made to a h.t. company supply. The normal rating of the new rectifiers is 4,478 amp. at 670 volts d.c., but overloads of 150 per cent. for two hours and 300 per cent. for five minutes can be carried. Power is received into the substation at 13,200 volts 60 cycles three-phase, and is transformed to 613-volt 60-cycle 12-phase current by two oil-insulated water-cooled transformers rated at 3,240 kVA. each. The old rotary substation had air-blast transformers. An average of about 6,250,000 gross ton-miles a month is handled over the Baltimore electrified lines, and the total kWh. used in the same period is about 500,000.